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FLORA OF PERU

J. Francis Macbride and Collaborators

Family Asteraceae: Part V

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FLORA OF PERU

Family Asteraceae: Part V

Abstract

The tribe Inuleae (Asteraceae) is treated for Peru and includes 19 genera, 55 species, and 2 varieties. Keys to genera and species, descriptions, and illustrations are provided for *Achyrocline* (5 spp.), *Antennaria* (1 sp.), *Belloa* (9 spp.), *Blumea* (1 sp.), *Chevreulia* (1 sp.), *Cuatrecasasiella* (1 sp.), *Facelis* (2 spp.), *Gamochaeta* (4 spp.), *Gnaphalium* (7 spp.), *Helichrysum* (1 sp.), *Jalcophila* (1 sp.), *Loricaria* (7 spp., 2 vars.), *Lucilia* (2 spp.), *Mniodes* (4 spp.), *Novenia* (1 sp.), *Pluchea* (4 spp.), *Pterocaulon* (1 sp.), *Stuckertiella* (1 sp.), and *Tessaria* (1 sp.). *Gamochaeta oreophila* Dillon & Sagást. (*nomen novum*) is provided to replace *G. monticola* Dillon & Sagást., an invalid name due to an earlier homonym.

Tribe INULEAE

Inuleae Cass., Jour. Phys. 88: 193. 1819. TYPE:
Inula L.

Gnaphalieae Rydb., Fl. Rocky Mts. 833. 1917. TYPE:
Gnaphalium L.

Dioecious or bisexual, annual or perennial herbs, shrubs, rarely trees; stems usually arachnoid or glandular. Leaves alternate or opposite, caudine or rosulate, the margins mostly entire. Capitulescences paniculate, spiciform, cymose-corymbiform, glomerulate, or of solitary heads. Capitula disciform, discoid, or rarely radiate; involucres cylindrical to campanulate or hemispherical; phyllaries numerous, usually imbricate, indurate or hyaline, scarious, usually stramineous, sometimes white, or variously colored; receptacles plane or convex, usually naked; marginal florets pistillate,

the corollas filiform or ligulate (rarely tubular), the styles divided into linear branches; disc florets usually hermaphroditic, functionally staminate or occasionally gynoecia fertile, the corollas tubular, the anthers connate, appendaged, bases obtuse to sagittate, usually caudate, the styles divided, bidentate, or undivided, the branches slender, subulate, and attenuate, or oblong-linear and rounded, obtuse, or truncate, unappendaged; ovaries mostly terete. Achenes mostly terete, small, often ribbed, variously pubescent, glandular, or glabrous; pappus bristles usually 1–2-seriate, smooth to scabrid, barbellate, or plumose, often fused at the base, deciduous together as a unit or persistent on the achene.

Inuleae is well defined in Peru; members may be recognized by alternate or at times rosulate leaves (opposite in *Chevreulia* and *Cuatrecasasiella*), usually with arachnoid pubescence and caudate anthers. In Peru, it includes 55 species and two varieties distributed in 19 genera. Several genera have centers of diversity in the Peruvian Andes, including *Belloa*, *Loricaria*, and *Mniodes*. A few members are used medicinally (e.g., *Achyrocline*, *Gnaphalium*, *Loricaria*, *Tessaria*) and one, *Helichrysum*, is cultivated for ornamental value.

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TURNER, B. L., A. M. POWELL, AND J. CUATRECASAS. 1967. Chromosome numbers in Compositae. XI. Peruvian species. Ann. Missouri Bot. Gard., 54: 172–177.

Key to Genera of Inuleae in Peru

1. Plants dioecious; individual capitula exclusively homogamous (polygamo-dioecious in *Antennaria*) 2
2. Erect shrubs or subshrubs, 20 cm tall or greater; stems laterally flattened; leaves laterally compressed XII. *Loricaria*
2. Cespitose, perennial herbs or suffruticose perennials, less than 20 cm tall;
stems cylindrical; leaves not laterally compressed 3
3. Stems clearly visible, internodes evident; basal leaves rosulate and caudine leaves alternate
or basal leaves lacking and caudine leaves opposite, decussate, mostly linear to oblong .. 4
 4. Basal leaves rosulate; capitulescences scapose, cymose-corymbose .. II. *Antennaria*
 4. All leaves opposite, caudine; capitula solitary, terminal VI. *Cuatrecasasiella*
3. Stems shortened into a dense cushion, internodes not evident; leaves spiral and tightly
appressed to the stem, imbricate, usually ovate to obovate XIV. *Mniodes*
1. Plants bisexual; individual capitula heterogamous 5
5. Styles of hermaphroditic (or functionally staminate) florets briefly divided at the apex, the
branches pilose along the dorsal side and the distal portion of the shaft, apex rounded; or greatly
divided with two linear branches, apex acute to rounded, pilose 6
 6. Stems winged, the wings discolored; leaves discolored; capitulescences spiciform-glo-
merulate; capitula sessile XVII. *Pterocaulon*
 6. Stems unwinged, or if winged, not discolored; leaves not discolored; capitulescences of
corymbiform cymes; capitula pedunculate 7
 7. Large shrubs or more often trees; capitula with only one hermaphroditic floret
..... XIX. *Tessaria*
 7. Shrubs or herbs; capitula with (3-)5-15 hermaphroditic florets XVI. *Pluchea*
5. Styles of hermaphroditic florets divided, the branches linear to oblong, apex truncate to acute
or rounded, dorsally papillose or with an apical ring of papillae 8
 8. Achenes densely sericeo-pubescent 9
 9. Plants caulescent; stems sparsely branched and erect or much-branched and cespitose
or decumbent 10
 10. Erect annual herbs; pappus bristles plumose VII. *Facelis*
 10. Cespitose perennial herbs; pappus bristles scabrous XIII. *Lucilia*
 9. Plants acaulescent, pulvinate XV. *Novenia*
 8. Achenes glabrous, papillose, or pubescent with scattered glandular or duplex trichomes ..
..... 11
 11. Achenes fusiform, terminally rostulate V. *Chevreulia*
 11. Achenes ovoid to oblong-cylindrical, not rostulate 12
 12. Pappus bristles free at the base (except *Helichrysum*), individually deciduous ..
..... 13
 13. Capitula solitary, pedicels evident; leaves glabrous or glandular on both sur-
faces 14
 14. Capitula 20-50 mm wide; phyllaries variously colored, greater than 2 mm
wide (cultivated) X. *Helichrysum*
 14. Capitula 4-5 mm wide; phyllaries green, less than 1 mm wide (native
species) IV. *Blumea*
 13. Capitula glomerulate, pedicels obscure; leaves tomentose (at least lower sur-
faces) 14
 15. Involucres cylindrical to narrowly oblong or narrowly campanulate; pis-
tillate florets 1-8 I. *Achyrocline*
 15. Involucres campanulate; pistillate florets 25-150 IX. *Gnaphalium*
 12. Pappus bristles fused at the base, deciduous together as a unit 16
 16. Stems 1-2 cm long; leaves oblong-lanceolate, 3.5-5 mm long, 0.5-1.5 mm
wide; pistillate florets usually 4 per capitulum XI. *Jalcophila*

16. Stems greater than 2 cm long; leaves linear-lanceolate to ovate, usually greater than 5 mm long, greater than 2 mm wide; pistillate florets usually 10 or more per capitulum 17
17. Hermaphroditic florets 4-merous XVIII. *Stuckertiella*
17. Hermaphroditic florets 5-merous 18
18. Style branches of hermaphroditic florets acute to rounded, evenly papillose externally and lacking an apical ring of collecting trichomes III. *Belloa*
18. Style branches of hermaphroditic florets truncate, not evenly papillose externally, but with an apical ring of collecting trichomes VIII. *Gamochaeta*

I. Achyrocline

Achyrocline (Less.) DC., Prodr. 6: 219. 1838.

TYPE: *Gnaphalium satureioides* Lam. ≡
Achyrocline satureioides (Lam.) DC.

Gnaphalium subgenus *Achyrocline* Less., Syn. Comp. 332. 1832.

Perennial herbs, suffrutescent or shrubs, tomentose or rarely glabrate; stems leafy, erect to decumbent or rarely scandent. Leaves alternate; petiolate or sessile; blades linear to ovate, arachnoid to lanate, the margins entire to crenulate. Capitulescences glomerulate, cymose-paniculate to corymbose, open or dense, rarely of solitary heads. Capitula 3–5.5 mm high, ca. 1.5–2 mm wide, disciform; involucres cylindric to narrowly oblong or narrowly campanulate; phyllaries imbricate, 2–3-seriate, scarious, brown to white or rarely reddish, the outer gradually shorter, base lanate, the inner glandular on abaxial surface; receptacles flat, naked or rarely with rudimentary paleae; pistillate florets 1–11(–23), the corollas filiform, dentate or shallowly 2–4-cleft; hermaphroditic florets 1–4(–6), fertile, the corollas tubular, base dilated, 4–5-lobed, the lobes usually pubescent with multicellular, stalked, capitate-glandular trichomes, the anther bases sagittate, caudate, the terminal appendages lanceolate, obtuse, the style branches slender, unappendaged, apex truncate, penicillate, the nectary conspicuous. Achenes oblong to ovoid, subcompressed, ca. 4–5-ribbed, papillose with imbricate cells; pappus bristles scabrid, barbellate, uniseriate, bases cohering by patent cilia, readily deciduous, apical cell rounded. Chromosome number: $n = 14$.

Key to Species of *Achyrocline*

1. Leaves decurrent; stems winged *A. alata*
1. Leaves not decurrent; stems not winged 2
2. Leaves linear to linear-lanceolate; outer phyllaries ovate, apex obtuse or rounded 3

A genus of 15–20 species distributed primarily in tropical and subtropical South America, with five in Mexico and Central America and a few in tropical Africa, Madagascar, and Comores. In Peru, it is represented by five species distributed in a wide variety of habitats and elevations throughout the Andean Cordillera. This genus most closely resembles *Gnaphalium* in habit and floral structure; however, *Achyrocline* is readily distinguished by its narrow capitula with fewer than 25 florets and glabrous achenes.

This genus is in need of experimental and field study throughout its range. Several of its species exhibit considerable morphological and ecological variability that presents problems for determining species boundaries.

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- NESOM, G. L. 1990. Taxonomy of *Achyrocline* (Asteraceae: Inuleae) in Mexico and Central America. Phytologia, 68: 181–185.

3. Plants with reduced habits, usually less than 50 cm tall; leaves 2–3(–5) cm long, 1–3 mm wide *A. ramosissima*
 3. Plants not reduced in habit, usually greater than 1 m tall; leaves 4–10 cm long, 2–9 mm wide *A. satureioides*
 2. Leaves lanceolate to elliptic or obovate; outer phyllaries lanceolate, apex acute 4
 4. Leaves elliptic to obovate, (0.5–)1.3–3.5 cm long, 5–16 mm wide *A. celosioides*
 4. Leaves lanceolate to elliptic, 1.5–5 cm long, 2–8 wide *A. peruviana*
1. ***Achyrocline alata* (Kunth) DC.**, Prodr. 6: 221. 1838.

Gnaphalium alatum Kunth, Nov. Gen. Sp. (fol.) 4: 62. 1820. TYPE: Ecuador, Prov. Chimborazo, "circa Alausi Quitensis," A. Bonpland 3243 (holotype, P, not seen, IDC Microfiche 6209. 96: II. 4, F neg. 37578, fragment, F).

Gnaphalium incanum Kunth, Nov. Gen. Sp. (fol.) 4: 63. 1820. TYPE: Peru, Dept. Cajamarca, Prov. Hualgayoc, "juxta urbem Micuipampa," 1830 m, A. Bonpland 3680 (holotype, P, not seen, IDC Microfiche 6209. 96: II. 5, F neg. 37601).

Gnaphalium pellitum Kunth, Nov. Gen. Sp. (fol.) 4: 63. 1820. TYPE: Peru, Dept. Cajamarca, Prov. Hualgayoc, "juxta urbem Micuipampa," 1830 m, A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209. 96: II. 6, F neg. 37604, fragment, F). Non *G. pellitum* Hort. Götting. ex DC.

Gnaphalium rufescens Kunth, Nov. Gen. Sp. (fol.) 4: 61. 1820. TYPE: Colombia, Prov. Cauca, "inter flumina Putes et villam San Miguel," A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209. 96: I. 7, F neg. 37571, fragment, F).

Achyrocline madiooides Meyen & Walpers, Nov. Actorum Acad. Caes. Leop.-Carol. German. Nat. Cur. (suppl.) 19: 275. 1843. TYPE: Peru, Dept. Arequipa, W. G. Walpers s.n. (holotype, B, probably destroyed, F neg. 15134).

Perennial herbs to 1.5 m tall; stems ascending to decumbent or scandent, glabrous to tomentose, alate. Leaves sessile; blade linear-lanceolate to oblanceolate, decurrent on stems, 2–12 cm long, 2–15 mm wide, trinerved from near the base, glabrous and glandular to densely tomentose beneath and arachnoid above, base attenuate, apex acute, the margins entire to crenulate. Capitulescences glomerulate, cymose-panicle, dense or open. Capitula 3.0–5.5 mm high, ca. 1.5 mm wide, sessile; involucres cylindrical to narrowly campanulate, yellow to cream-white; outer phyllaries ovate to lanceolate, 2–3 mm long, 1–1.5 mm wide, apex acute, the inner phyllaries linear-spatulate, 4–5 mm long, 0.5–1.5 mm wide, apex acute to obtuse; pistillate florets 3–11(–23), the corollas 2.5–4.0 mm long; hermaphroditic florets 1–3(–6), the corollas 2.5–4.0 mm long. Achenes narrowly ellipsoid to ovoid, 0.5–0.7 mm long; pappus ca. 2.5 mm long. Chromosome number: $n = 14$ (Jansen & Stuessy, 1980).

Achyrocline alata has a wide distribution throughout the Andean Cordillera from Colombia to Argentina, Brazil, and Paraguay. It inhabits a variety of environments within its range, but in Peru it is usually found in secondary vegetation or disturbed roadsides (2400–4100 m). In Peru it is known by the common names: *ajeno*, *Foster-sacha*, *huira-huira*, *ishpingo amarillo*, *vira-vira*, *yatama blanca*, and *yshpingo*.

Achyrocline alata is readily distinguished from other Peruvian species by its decurrent leaf bases and alate stems. Pubescence is quite variable; individuals range from predominately glabrous to densely arachnoid-tomentose. No ecological or geographical patterns are obvious for these pubescence morphs, and the capitular and floral morphology is relatively constant. *Gnaphalium incanum*, *G. pellitum*, and *G. rufescens* are all readily referable to *Achyrocline*. They are all quite pubescent, and their decurrent leaf bases forming winged stems and few-flowered capitula agree well with the present broad concept of *A. alata*. *Achyrocline madiooides* Meyen & Walpers is provisionally placed here also. Further detailed populational investigations may lead to the taxonomic recognition of these pubescent morphs.

Individuals with smaller leaves, greatly reduced stem wings, and smaller, few-flowered capitula approach *A. satureioides*, a species with linear leaves, unwinged stems, and narrowly cylindrical capitula. While *A. alata* and *A. satureioides* are closely related, the latter species is typically found at elevations below 1500 m. We have not found sympatric populations to date, but two collections (*Vargas 456*, F, and *Weberbauer 5638*, GH) have stems both with and without wings.

AMAZONAS. Chachapoyas: 28–31 km SW of Leimebamba on road to Balsas, 3350–3450 m, *Gentry et al. 23158* (F, MO); 41 km SW of Leimebamba on road to Balsas, 3110 m, *Gentry et al. 23147* (F, MO); Cerros Calla Calla, W side, 45 km above Balsas, 3100 m, *Hutchison & Wright 5774* (F, GH, MO, NY); Cerro Chimchula, cerca a Chachapoyas, 2500 m, *Ochoa 1628, 1637* (F); rocky slopes of Caño Santa Lucía just E of Chachapoyas, 2200–2300 m, *Wurdack 726* (GH, NY, US). **Rodríguez de Mendoza:** Mendoza, 1600 m, *Wojtykowski 8273* (GH, MO). **ANCASH. Bolognesi:** Valle de Río Fortaleza, 3600 m,

Cerrate & Gayoso 7819 (MO); Chiquián, 3350 m, *Ferreira* 7455 (MO, US). **Casma:** abra de la Cordillera Negra, 4050 m, *Mostacero et al.* 536 (F, HUT, MO). **Huaráz:** Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, HUT, MO); Laguna de Shurup, 3800 m, *Evangelista s.n.* (F, HUT, MO). **Huaylas:** Laguna de Parón, 4100 m, *Mostacero et al.* 540, 553 (F, HUT, MO). **Yungay:** Llanganuco, *Ferreira* 14342, 16826, 16863 (MO, USM); slopes below Laguna de Llanganuco in Quebrada de Llanganuco, ca. 25 km above Yungay, 4000 m, *Edwin & Schunke* 3818 (COL, F, US); Yungay-Yauya road, 3480 m, *Gentry et al.* 37366 (F, MO). **APURÍMAC. Abancay:** arriba de Abancay, 3350–3450 m, *Ferreira* 9812 (MO, USM). **Aymaraes:** 4 km SW of Cotaruse, 26 km SW of Chalhuanca, 3220 m, *Gentry et al.* 23302 (F, MO, USM). **AYACUCHO. Huanta:** Ccarrapa, between Huanta and Río Apurímac, 1200 m, *Killip & Smith* 22430 (F, US). **La Mar:** above Ayna (Aina), 1600 m, *Weberbauer* 5638 (F, GH, US). **CAJAMARCA. Cajamarca:** ca. 6.5 km SW of Cajamarca, 2980 m, *Dillon et al.* 2904 (F, MO, TEX, USM); San Juan de Cajamarca, 2800 m, *Ochoa* 1475 (GH, F); La Encañada-Jalca de Kumulca, 3300 m, *Sagástegui et al.* 8100 (F, HUT, MO, NY), 8105A (HUT, MO); NE of Porcón, Sánchez 2858 (CPUN, F). **Celendín:** 4 km NNE of Celendín on road to Balsas, *Edwin & Schunke* 3582 (COL, F, NY, US); entre Celendín y Jalca Cumulca, 3000–3100 m, *Ferreira* 15087 (MO, US, USM); Celendín, 2700 m, *Hutchison & Wright* 5127 (F, MO, NY); Canyon of the Río Marañoñ above Balsas, 2930 m, *Hutchison & Wright* 5374 (F, MO, NY). **Chota:** Cochabamba, 1800–2200 m, *Ferreira* 783 (USM). **Contumazá:** Guzmango, *Sagástegui* 7726 (F, HUT); Cascabamba, 3050 m, *Sagástegui et al.* 9038 (F, HUT, K, MO); Jalca El Chuño (Pozo Chuño), 4500 m, *Sagástegui et al.* 9373 (F, HUT, MO); Cruz del Hueco, 2800 m, *Sagástegui et al.* 9918 (F, HUT, MO). **Cutervo:** 4 km E of Huambos on Cutervo trail, 2800 m, *Stork & Horton* 19199 (F). **CUZCO. Anta:** Limatambo, 2400 m, *Vargas* 456 (MO). **Calca:** Amparacs, 3300 m, *Chávez* 3283 (MO). **Cuzco:** San Sebastián, 3300–3400 m, *Pennell* 13626 (F, GH, NY, US). **Paruro:** Araypallpa, 3200 m, *Vargas* 456 (F). **Paucartambo:** 9–12 km NE of Paucartambo, 2980–3050 m, *Gentry et al.* 23413, 23423 (F, MO, USM); 22 km NE of Paucartambo, 3350 m, *Gentry et al.* 23430 (F, MO, USM); Cerro de Cusilluyoc, Pillahuata, 2700–2900 m, *Pennell* 14089 (GH). **Urubamba:** Machupicchu, 2400 m, *Herrera* 1974 (F); Ollantaytambo, 2800 m, *Herrera* 3447 (F); Machu Picchu, above Paucarcancha, 3225 m, *Peyton & Peyton* 133 (F). **HUÁNUCO. Huamalies:** Llata, 7000 ft, *Macbride & Featherstone* 2242 (F, GH, US). **Huánuco:** cerca a Mito-cucho, 2600 m, *Cerrate et al.* 6887 (MO, USM); between Huánuco and Chincha, *Dwyer* 6115 (MO); Sheiricancha, cerca a Acomayo, 2500–2600 m, *Ferreira* 9333 (MO, USM); Acomayo, Distrito de Chincha, 2500 m, *Ridout* 11560 (MO, USM). **Pachitea:** Mitotambo, arriba de Mito, 3200–3300 m, *Ferreira* 10380, 10380A (USM). **ICA. Nazca:** Puquio Valley, 3400 m, *Rauh & Hirsch* P435 (NY). **Pisco:** Valle Río Pisco, 3700 m, *Rauh & Hirsch* P354 (NY). **JUNÍN. Concepción:** Mito, 9000 ft, *Macbride & Featherstone* 1474, 1475 (F), 1644 (F, US), 1818 (F, GH, US). **Huancayo:** Km 7 Huancayo-Pariacocha, 3300 m, *Antúñez de Mayolo* 38 (F); Huancayo, 3317 m, *Soukup* 2955 (COL), 3003 (F), 3151 (COL, US, USM). **Jauja:** Comas, *Ochoa* 549 (F). **Tarma:** cumbre a Tarma, 3500 m, *Cerrate* 922 (MO, USM); 28–32 km NE of Tarma on road to San Ramón, 2480 m, *Dillon & Turner* 1348 (F, MO, TEX, USM); entre Tarma y San Ramón, 1800–2100 m, *Ferreira* 3606 (MO, USM); Tarma, 3000–3200 m, *Killip & Smith* 21914 (F, NY, US); Huacapista, 1800–2400 m, *Killip & Smith* 24206 (NY, US); Tarma, *Macbride & Featherstone* 988 (F); Sacsamarca, *Riccio* 1541 (US); entre Tarma y Oroya, 10 km de Tarma, 3600 m, *Tovar* 2380 (USM). **Yauli:** San Pedro de Cajas, S of Lake Junín, 3800–3900 m, *Pearsall* 924 (F). **LA LIBERTAD. Otuzco:** Agallpampa, 3050 m, *López* 1873 (F, HUT). **Patáz:** Huancaspata-Tayabamba, 3900 m, *López & Sagástegui* 8266 (HUT, MO). **Santiago de Chuco:** Laguna La Victoria, camino a Conzupo, 4000 m, *Sagástegui et al.* 6190 (HUT, MO). **LIMA. Canta:** 3100–3200 m, *Pennell* 14612 (F, NY, US). **Huarochirí:** Puente de Infernillo, *Cerrate et al.* 4278 (MO, USM); Chicla, entre San Mateo y Casapalca, 3700 m, *Ferreira* 6505 (MO, US, USM); Infernillo, 3300 m, *Ferreira* 8318 (MO, USM); 4 km E of Chicla, 3800 m, *Gentry & Prance* 16448 (F, MO); Río Blanco, 3000–3500 m, *Killip & Smith* 21637 (F, NY, US), *Macbride & Featherstone* 672 (F, US). **PASCO. Daniel Carrión:** Yanahuana, ca. 10,000 ft, *Macbride & Featherstone* 1193 (F, US). **Pasco:** ca. 23 km NNE of Cerro de Pasco on road to Huánuco, 3810 m, *Dillon* 2552 (F, MO, USM); La Quinua, ca. 12,000 ft, *Macbride & Featherstone* 2021 (F, US). **PIURA. Huancabamba:** Huancabamba, 2950 m, *Hutchison* 1603 (F, NY); Mitopampa (Huancabamba-Cuello del Indio), 2650 m, *Sagástegui et al.* 8227 (MO, NY). **PUNO. Carabaya:** Macusani to Ollachea, 2000–3000 m, *Dillon et al.* 1099, 1265 (F, MO, USM); Ollachea to San Gabón, 1000–2000 m, *Dillon et al.* 1103 (F, MO, USM). **SAN MARTÍN. Mariscal Cáceres:** Río Abiseo National Park, 3425 m, *Young & Watson* 3519 (F).

2. Achyrocline celosioides (Kunth) DC., Prodr. 6: 221. 1838.

Gnaphalium celosioides Kunth, Nov. Gen. Sp. (fol.) 4: 61. 1820. TYPE: Ecuador, Prov. Loja, “crescit juxta Loxam Peruvianorum,” *A. Humboldt & A. Bonpland* s.n. (holotype, P, not seen, IDC Microfiche 6209. 96: II. 2, F neg. 37585).

Perennial herbs or shrubs to 0.5 m tall; stems much-branched, ascending to procumbent. Leaves sessile; blade elliptic to obovate, (0.5)–1.5–3.5 cm long, (0.3)–0.5–1.6 cm wide, trinerved from near the base, discolored, both surfaces tomentose, apex obtuse to rounded, base obtuse to cuneate. Capitulescences glomerulate, cymose-paniculate, dense or open. Capitula 4–5 mm high, ca. 1.5 mm wide, sessile; involucres cylindrical, white; outer phyllaries ovate, ca. 2.5 mm long, 0.8–1 mm wide, apex acute, the inner phyllaries lanceolate to oblanceolate, 3.5–4.0 mm long, 0.4–0.8 mm wide, apex acute to apiculate; pistillate florets 2, the corollas 2.0–2.5 mm long; hermaphroditic florets 3, the corollas 2.2–2.5 mm long. Achenes ovoid, 0.7–0.8 mm long; pappus ca. 2.5 mm long.

Achyrocline celosioides ranges from southern Ecuador to south-central Peru (2000–3400 m) and

normally occupies relatively moist sites in inter-Andean valleys. It is readily distinguished from *A. peruviana*, its nearest relative, by the former's shorter, elliptic leaves.

A few populations display considerable variation in leaf size and shape. Two unusual collections from the Cumbre El Gavilán (above Cajamarca) display the following variability: (1) *Ferreyra* 3277 (us), has very densely lanate stems with short internodes; ovate, sessile leaves; and sessile, glomerulate capitulescences in the upper leaf axils; (2) *Ferreyra* 8538 (MO) has very small leaves (ca. 5 mm long, ca. 3 mm wide) and capitulescences on short peduncles.

Two collections, *Sagástegui & Dillon* 12312 (Dept. Ancash) and *Chávez* 3372 (Dept. Apurímac) have more narrowly elliptic, sessile leaves and compact, nearly sessile glomerulate capitulescences. Last, a collection from a dry site above the Río Marañón (*Evinger & Hodge* 514, US) has smaller, more narrowly lanceolate leaves, but with capitulescences typical for the species. All these specimens essentially agree with *A. celosioides* in capitular and floral characteristics, but further study may prove them to be worthy of specific rank.

AMAZONAS. *Bongará*: between Río Utcubamba and Shipasbamba, 1520 m, *Hutchison & Wright* 3994 (UC). **Chachapoyas**: 10 km E of Balzas [Balsas], *Evinger & Hodge* 514 (us); rocky slopes of Caño Santa Lucía just E of Chachapoyas, 2000–2400 m, *Wurdack* 532, 579 (GH, NY, UC, us). **ANCASH.** *Recuay*: rocky river bluffs, ca. 9000 ft, *Macbride & Featherstone* 2517 (F). **APURÍMAC.** *Abancay*: Curahuasi, 2550 m, *Chávez* 3327 (MO). **CAJAMARCA.** *Cajabamba*: camino a Langla, 2600 m, *Mostacero & Guerra* 0008 (HUT). *Cajamarca*: Cumbre El Gavilán, entre Cajamarca y San Juan, 3200 m, *Ferreyra* 3277 (us), 8583 (MO); La Encañada-Jalca de Kumuca, 3300 m, *Sagástegui et al.* 8106 (HUT); La Encañada, 2750 m, *Sagástegui et al.* 12013 (HUT). *Celendín*: ca. 31 km NE of Cajamarca along road to Celendín, E slopes, ca. 2950 m, *Dillon & Turner* 1587 (F); hills above and to N of town, ca. 2700 m, *Hutchison & Wright* 5136 (UC). *Hualgayoc*: Bambamarca, 2600 m, *Soukup & Carmona* 4935 (us). **JUNÍN.** *Concepción*: Mito, ca. 9000 ft, *Macbride & Featherstone* 1489 (F). **Prov. Unknown:** Uspachaca, ca. 8500 ft, *Macbride & Featherstone* 1295 (F). **LA LIBERTAD.** *Santiago de Chuco*: Hacienda Angasmarca, 2850 m, *Weberbauer* 7205 (F, GH). **PIURA.** *Huancabamba*: on road to Canchaque, 18.5 km above and W of Huancabamba, 2900 m, *Hutchison & Wright* 6635 (F, MO, NY, UC, USM).

3. ***Achyrocline peruviana* Dillon & Sagást., Phytologia** 60: 107. 1986. **TYPE:** Peru, Dept. Cajamarca, Contumazá, El Granero, laderas abiertas, 2800 m, 14 Jun 1983, *A. Sagástegui*

A. & S. López M. 10661 (holotype, HUT). **Figure 1.**

Suffrutescent **perennials** to 75 cm tall, much-branched at the base; stems arachnoid-tomentose. Leaves sessile; blade narrowly lanceolate to elliptic, (1.5–)4–5 cm long, 2–8 mm wide, discolorous, base attenuate, apex acute, mucronulate, lower surface densely arachnoid-tomentose, upper surface sparsely arachnoid-tomentose, glabrescent, obscurely trinervate, the margins entire. **Capitulescences** glomerulate, cymose-paniculate, open, terminal and axillary. **Capitula** ca. 4 mm high, 1.2–1.5 mm wide, sessile; involucres narrowly campanulate, stramineous; outer phyllaries lanceolate, 2–3 mm long, ca. 1 mm wide, apex acute, the inner phyllaries lanceolate, 3–4 mm long, 1–1.2 mm wide, apex acute; pistillate florets 1–2, the corollas ca. 2 mm long; hermaphroditic florets 2–3, the corollas ca. 2.5 mm long. **Achenes** ovoid, ca. 1 mm long; pappus ca. 2.5 mm long.

Achyrocline peruviana is a narrow endemic known only from dry intermontane localities in the Departments of Cajamarca and La Libertad (2600–3100 m) and is primarily restricted to river valley systems with Pacific drainage. It most closely resembles *A. celosioides*, but differs from that species by possessing more narrowly elliptic or lanceolate leaves, usually at least 4 cm long, with acute, mucronulate apices.

Some individuals of *A. satureioides* approach *A. peruviana* in general appearance, but the former species has strictly cylindrical capitula, with a greater number of pistillate florets and a distribution usually below 1500 m on the eastern escarpment of the Andean Cordillera.

CAJAMARCA. *Contumazá*: 1–2 km S of Contumazá, 2620 m, *Dillon et al.* 4455 (F, HUT, MO, TEX, US, USM); *Contumazá*, 2600 m, *Sagástegui et al.* 10685 (F, HUT, MO). **LA LIBERTAD.** *Huamachuco*: Hda. Cochabamba, 2750 m, *López & Sagástegui* 2781 (HUT). *Otzuzco*: Agallapampa, 3100 m, *López* 895 (us), 1867 (F, HUT).

4. ***Achyrocline ramosissima* (Schultz-Bip.) Britton, Bull. Torrey Bot. Club** 19: 148. 1892.

Gnaphalium ramosissimum Schultz-Bip., Bonplandia 4: 42. 1856. **TYPE:** Peru, Dept. Puno, Azángaro, cordillera prope Azángaro, 1854, *W. Lechler* 1780 (holotype, B, probably destroyed; isotypes, F, NY, G-DEL, not seen, F neg. 28706, w, not seen, F neg. 33153).

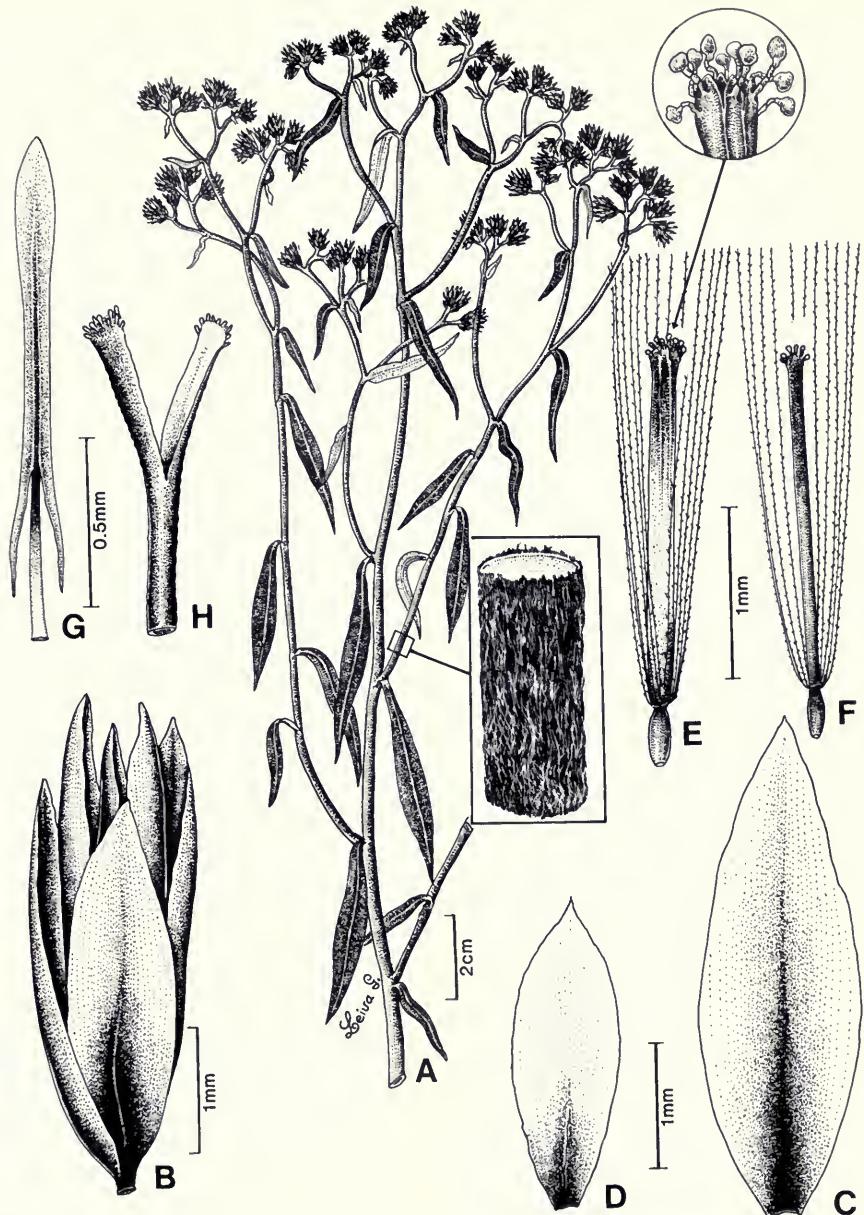


FIG. 1. *Achyrocline peruviana*. A, habit; B, capitulum; C, inner phyllary; D, outer phyllary; E, hermaphroditic floret; F, pistillate floret; G, stamen; H, style branches of hermaphroditic floret. (Drawn from Sagástegui & López 19661, HUT.)

Perennial herbs, 15–50(–70) cm tall, suffruticose; stems much-branched, decumbent to ascending, densely lanate. Leaves sessile; blade linear to linear-lanceolate, 2–3(–5) cm long, 1–3 mm wide, discolored, the lower surfaces densely lanate, the upper surfaces tomentose, the margins

entire, revolute. Capitulescences corymbiform cymes of glomerules, dense or open. Capitula ca. 4 mm high, ca. 1.5 mm wide, stramineous; involucres cylindrical; outer phyllaries ovate, 1.5–2 mm long, 1–1.2 mm wide, 2–3-fid, base lanate, the inner phyllaries lanceolate to oblanceolate, 3–

3.5 mm long, 0.5–0.8 mm wide; pistillate florets generally 4, the corollas ca. 2.5 mm long; hermaphroditic floret 1, the corollas ca. 2.8 mm long. Achenes ellipsoid, ca. 0.7 mm long; pappus 2.5–3 mm long.

Achyrocline ramosissima is distributed from central Peru to northwestern Argentina. In Peru, it occurs in *puna* formations from Junín to Puno (2800–4300 m). It most closely resembles *A. satureioides* but is distinguished from that species by its reduced habit, smaller leaves and capitula, and high-elevation distribution.

Several collections appear to approach *A. satureioides* in habit, but these collections have the small capitula characteristic of *A. ramosissima*: López M. 618 (HUT), Cook & Gilbert 523, 702 (US), Macbride & Featherstone 239 (F), 1020 (F, GH, US), Killip & Smith 21828 (F, NY), Iltis et al. 66 (F).

ANCASH. Huaylas: Huascarán National Park, Auquispuquio, 3900–4000 m, Smith et al. 12104 (USM). **AREQUIPA.** Arequipa: Km 18 on road between Arequipa and Yura, 3300 m, Solomon 2848 (MO). **CUZCO.** Anta: Huanacorí, El Chaccan, 3690 m, Brunel 901 (MO). Calca: Hda. Urco, 2800 m, Vargas 1768 (GH, NY). Cuzco: Saqsaywaman, 3600 m, López 0618 (HUT); ca. 2 km S of San Gerónimo, 10 km SE of Cuzco, 3200 m, Solomon 3000 (MO). Espinar: Puerto Rosario, Río Apurímac, 3900 m, Vargas 10103 (F). Urubamba: Ollantaytambo, 2800 m, Herrera 3399 (F), Cook & Gilbert 523, 702 (US). **HUANCAVELICA.** Huancavelica: Caniorconca, 3 km SE of Conaica, Tovar 98 (US p.p.); Peccsuca, a 5 km E de Conaica, 3250–3280 m, Tovar 276 (US); Pana, cerca a Conaica, 3320 m, Tovar 760 (US, USM). **JUNÍN.** Huancayo: Huancayo, 3317 m, Soukup 1877 (US, USM). Tarma: ca. 18 km SSE of Tarma, Río Quishuarocha, Iltis et al. 66 (F, US); Tarma, 3000–3200 m, Killip & Smith 21828 (F, NY, US); Tarma, Macbride & Featherstone 1020 (F, US). Yauli: Baños, Capt. Wilkes s.n. (NY p.p.). **LIMA.** Huarchichirí: Matucana, 8000 ft, Macbride & Featherstone 239 (F). **PUNO.** Azángaro: Cuturi, entre Aropa y Azángaro, 4200 m, Aguilar 411 (MO, USM); Isla Arapa, Aguilar s.n. (USM). Huancané: Moho, 3900 m, Aguilar 435 (MO, USM). Melgar: Araranca, 4100–4300 m, Pennell 13484 (F, GH, NY, US, USM). Puno: near Puno, Soukup 93 (F). NO EXACT LOCALITY. "Perou austral," 3500 m, Weddell 4506 (F).

5. *Achyrocline satureioides* (Lam.) DC., Prodr. 6: 220. 1838.

Gnaphalium satureioides Lam., Encycl. 2: 747. 1788.
TYPE: Uruguay, Montevideo, 1767, P. Commerson s.n. (holotype, P, not seen, F neg. 37572; isotype, G-DEL, not seen, F neg. 28707).

Perennial herbs to 2 m tall, suffruticose; stems much-branched, ascending to decumbent, densely

lanate. Leaves sessile; blade linear to linear-lanceolate, 4–10 cm long, 2–9 mm wide, apex acute. Capitulescences glomerate, cymose-paniculate, terminal and axillary. Capitula 4.5–5.5 mm high, ca. 1.5 mm wide; involucres narrowly cylindrical; outer phyllaries narrowly ovate to lanceolate, 2.5–3.5 mm long, ca. 1 mm wide, the inner phyllaries lanceolate to linear, 4–4.5 mm long, 0.5–1 mm wide; pistillate florets 4(–8), the corollas 3.2–3.6 mm long; hermaphroditic florets 1–2, the corollas 3.4–3.6 mm long. Achenes ovoid, 0.6–0.7 mm long; pappus ca. 4 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984).

Achyrocline satureioides is widely distributed throughout South America in sandy soils, usually at elevations below 2000 m. In Peru it is most commonly found in forest clearings and disturbed sites along the eastern slope of the Andean Cordillera (500–1500 m).

It appears most closely related to *A. ramosissima*, a smaller, alpine species, which most likely is a high-elevation derivative of *A. satureioides*.

Label data from Klug 3257 (F) state that the plant is used medicinally: "A preparation from this plant is taken as a drink for kidney troubles. The natives are acquainted with 'Foster's Pills,' used for the same disorders, whence the name Wild Foster." The gathering and transport of this species for sale in local markets may explain the occasional plant found outside its usual distributional range at lower elevations. In Peru, it is known by the following common names: *coronilla-sacha*, *huira-huira*, *huira huayo*, *Foster-sacha*.

AMAZONAS. Bongará: between Río Utcubamba and Shipasbamba, 4 km from Campamento Ingenio, 1520 m, Hutchison & Wright 3954 (F, MO, NY, UC). Rodríguez de Mendoza: Mendoza, 1500 m, Woytkowski 8115 (GH, MO). **CUZCO.** La Convención: mountains between Potocusi and Sahuayacu, 1000–1100 m, Weberbauer 7946 (F, GH, MO, US). **HUÁNUCO.** Huánuco: Cotirarda to Mercedes, 1875 m, Mexia 8194 (F, GH, MO, NY, US). **LEONCIO PRADO:** Pampayacu, hacienda at mouth of Río Chincha, 3500 ft, Macbride 5039 (F, GH, US), Kanehira 287 (GH). **JUNÍN.** Tarma: Chuyquishunca, 2 km arriba de Huacapistana, entre Tarma y San Ramón, 2000–2400 m, Ferreyra 466 (USM); Chanchamayo Valley, 1200–1500 m, Schunke 365, 1074, 1536, 1622 (F). **PUNO.** Sandia: along Río Tambopata in vicinity of San Juan del Oro, 1900 m, Wasshausen & Salas 1231 (US); Sandia, 2250 m, Vargas 14800 (US). **SAN MARTÍN.** Huallaga: cerca a Bellavista, 250–350 m, Ferreyra 10080 (MO, USM). Lamas: Lamas, below English Evangelical Mission, Belshaw 3447 (F, GH, MO, NY, US); San Roque, 1350–1500 m, Williams 7282 (F). **Moyobamba:** Zepelacio, near Moyobamba, 1200–1600 m, Klug 3257 (F, MO, NY, US). **San Martín:** Tarapoto, 400 m, Schunke 6420 (F); prope

Tarapoto, Spruce 4174 (GH, NY). Rioja: Rioja, Woytkowski 6169 (GH, MO, US). NO EXACT LOCALITY. 1862, Matthews s.n. (NY p.p.).

II. Antennaria

Antennaria Gaertn., Fruct. Sem. Pl. 2: 410. 1791.

TYPE: *Gnaphalium dioicum* L. ≡ *Antennaria dioica* (L.) Gaertn.

Dioecious or polygamo-dioecious, perennial herbs; stems simple, ascending or erect, tomentose or lanate. Basal leaves rosulate, oblanceolate to spatulate, entire; cauline leaves alternate, smaller. Capitulescences cymose-corymbose, racemose, or glomerulate, terminal, occasionally of a solitary head. Capitula discoid or rarely disciform; involucres ovoid or campanulate; phyllaries imbricate, scarious, the outer gradually narrowing, the inner prolonged into a petaloid lamina; receptacles convex to plane, epaleaceous; pistillate florets with corollas filiform, white or lilac, truncate or subdente; staminate florets with corollas tubular, 5-lobed or 5-dentate, the anther bases sagittate, caudate, the terminal appendages ovate, the styles undivided or briefly bifid, the branches truncate. Achenes cylindrical or ellipsoidal, rounded or sub-compressed; pappus bristles uniseriate, scabrid, barbellate, fused at base or free, apices clavellate (stamineate) or acute (pistillate). Chromosome numbers: $x = 14$.

A genus of some 50 species distributed principally in arctic to temperate regions of the Northern Hemisphere. Three species are known from South America and only one from Peru. In many species, masculine individuals are rare or completely absent, suggesting apomictic seed production.

Reference

CABRERA, A. L. 1957. Una nueva especie del género *Antennaria* (Compositae). Notas Mus. La Plata, Bot., 19: 73-79.

1. *Antennaria linearifolia* Wedd., Chlor. And. 1: 150. 1856. TYPE: Peru, no exact locality, *J. Dombey* or *J. Pavón* (syntypes probably p, not seen). (Two syntype collections were cited by Weddell, but no lectotype will be chosen until the type material can be studied.) **Figure 2.**

- Leontopodium linearifolium* (Wedd.) Benth. & Hook., Gen. Pl. 2: 303. 1873.
Gnaphalium linearifolium (Wedd.) Franchet, Bull. Soc. Bot. France 39: 135. 1892.
Gnaphalium sedoides F. W. Klatt, Linnaea 42: 135. 1878-79. TYPE: Peru, *J. Dombey* 252 (holotype, p, not seen, f neg. 37609; isotype, GH).

Dioecious or rarely polygamo-dioecious, perennial herbs, rhizomatous; stems unbranched, 3-21 cm tall. Leaves basal, rosulate, sessile; blade oblanceolate-linear, 2-8 cm long, 1.5-3 mm wide, the lower surface densely tomentose, midrib prominent, the upper surface glabrescent, the margins entire. Capitulescences glomerulate, subtended by foliaceous bracts. Capitula 5-7 mm high, 3-5 mm wide, discoid, homogamous, rarely disciform and heterogamous; involucres campanulate; phyllaries 4-5-seriate, the outer ovate, 3-4 mm long, ca. 2.5 mm wide, apex obtuse, the inner oblate to oblong-lanceolate, 4-5 mm long, 1-2 mm wide, the apex prolonged into a white, petaloid lamina; masculine capitula with 40-50 functionally staminate florets, the corollas narrowly tubular, 3-3.5 mm long; feminine capitula with 50-60 pistillate florets, the corollas filiform, 2.5-3 mm long; heterogamous capitula disciform with 50-60 pistillate florets, the corollas filiform, 2.5-3 mm long, functionally staminate florets 6-8, the corollas narrowly tubular, 3.5-4 mm long. Achenes cylindrical, 0.5-0.7 mm long, pubescent with sessile, biseriate, capitate-glandular trichomes; pappus bristles ca. 3.5 mm long, apices clavellate (stamineate) or acute (pistillate).

Antennaria linearifolia is distributed throughout the Andean Cordillera from southern Ecuador to Bolivia. In Peru it occurs from Amazonas to Cuzco at elevations of 2700-4000 m.

Collections of this species are commonly annotated as *Gnaphalium*; however, the dioecious or polygamo-dioecious reproductive system and dimorphic pappus bristles clearly place these taxa in *Antennaria*. Masculine, feminine, and occasionally individuals with heterogamous capitula are encountered within Peruvian populations.

In Peru *A. linearifolia* is known as *champito*, a name applied to many rosulate or cespitose species of Asteraceae.

AMAZONAS. Chachapoyas: Cerros Calla Calla, E side, 19 km above Leimebamba on road to Balsas, 3100 m, Hutchison & Wright 5560 (F, MO, NY, US); Puma-urcu, SE of Chachapoyas, 3100-3200 m, Wurdack 1135 (us); Cerro Campanario NNE of Diosan, 3200-3500 m, Wurdack 1603 (us). **ANCASH.** Bolognesi: Chiquián, 3840-



FIG. 2. *Antennaria linearifolia*. A, habit; B, masculine capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, masculine floret; G, stamen; H, achene. (Drawn from Sagástegui et al. 11588, HUT.)

3860 m, Ferreyra 5766 (us, USM). **Huaráz:** Cerro San Cristóbal, NE of Huaráz, 3800 m, Evangelista s.n. (HUT). **Huari:** Huascarán National Park, 1 km below Manto Mina, 4300 m, Smith & Buddensiek 11010 (F.p.p.), 14.8 km NE of Tunel Cahuish along road between Catac and

Chavín de Huantar, 3000–4000 m, Stevens 21965 (MO). **CAJAMARCA:** Cajamarca on road to Hualgayoc, Pampa de Cerro Negro, 3600 m, Dillon & Molau 3023A (F). **Celendín:** ca. 57 km NE of Cajamarca along road to Celendín, 3650 m., Dil-

*lon & Turner 1611 (F). Contumazá: above Contumazá, 2700 m, Sagástegui & Fukushima 6098 (HUT, US); Pozo Kuán, 3600–3800 m, Sagástegui et al. 10086 (HUT), 12451 (HUT, MO). San Miguel: Taulín Alto (jalca), 3100 m, Sagástegui et al. 9543 (F, HUT). CUZCO. Paucartambo: Tres Cruces, 3330–3500 m, Gentry et al. 23439 (F, MO); Corihuayrachina, Callanga, 3800 m, Woytkowski 565 (MO). Urubamba: Machu Picchu, on the Palcay side of the Salcantay-Palcay pass, 3500 m, Peyton & Peyton 711 (MO). HUÁNUCO. Dos de Mayo: Probreco, 12 mi E of Huallanca, ca. 10,500 ft, Macbride & Featherstone 2463 (F, US). Huánuco: Pillao, 2700 m, Woytkowski 34041 (F). JUNIN. Concepción: 6 mi S of Mito, ca. 11,000 ft, Macbride & Featherstone 1819 (F, US). Huancayo: Huancayo, 4000 m, Soukup 1870 (US); Laguna Huacracocha, 5000 m, Soukup 3612 (F). LA LIBERTAD. Huamachuco: ca. 20 km W of Huamachuco, ca. 3400 m, Dillon et al. 2809 (F, USM); Cacana, 3300–3400 m, Ricchio & La Rosa 3564 (US). Otuzco: Cerro Sango, Motil-Shorey, 3300–3400 m, López 968 (US), 1950 (HUT); Sagástegui et al. 11588 (HUT, MO). Patáz: Quebrada Rangia, Tayabamba-Huancaspata, 3600 m, López & Sagástegui 8208 (HUT, MO, NY). Sánchez Carrión: ca. 10 km N of Laguna Saucacocha, ca. 20 km NE of Huamachuco, ca. 3370 m, Dillon et al. 2845 (F, MO, TEX, USM). LIMA. Chancay: Auquimarca, 4000 m, Abdon 3271 (F). PASCO. Pasco: Cerro de Pasco, 4135 m, Ellenberg 4123 (US). NO EX-
ACT LOCALITY. Weberbauer 7004 (F).*

III. *Belloa*

Belloa Remy in Gay, Fl. Chil. 3: 336. 1848. TYPE: *Lucilia chilensis* Hook. & Arn. ≡ *Belloa chilensis* (Hook. & Arn.) Remy.

Perennial herbs, pulvinate or erect, generally lanate or tomentose. Leaves alternate or rosulate, rarely distichous, the margins entire. Capitulescences pseudospicate, glomerulate, or of solitary heads, terminal and axillary. Capitula disciform; involucres ovoid, campanulate, or narrowly cylindrical; phyllaries 3–5-seriate, imbricate, scarious, hyaline at margin, concave, stramineous, the inner gradually longer; receptacles plane, naked, alveolate; pistillate florets 1–6-seriate, the corollas filiform, lacerate, the styles exserted; hermaphroditic florets (1–)10–15, the corollas narrowly tubular, 5-lobed, the anther bases caudate, the terminal appendages ovate to oblong, the style branch apices obtuse or rounded, dorsal surfaces papillose. Achenes obovoid or ellipsoid, pubescent with biseriate, multicellular, capitate-glandular trichomes; pappus bristles 40–80, scabrid, white to lutescent, the bases fused, deciduous together as a unit, apical cells acute or rounded. Chromosome number: $n = 12$ (Fernández Casas & Fernández Piqueras, 1981).

Belloa consists of 18 species distributed in high-elevation habitats throughout the Andes from Venezuela to Chile and Argentina. Peru appears to be a center of diversity for the genus, with eight species represented.

Freire (1986) expanded the generic limits of *Lucilia* to include all taxa previously accorded to *Belloa* (Cabrera, 1958; Sagástegui & Dillon, 1985) with the statement that the presence or absence of trichomes on the achenes was not sufficient for recognition of the genus. She did recognize the monophyletic nature of *Belloa* and chose to place its component species into section *Lucilioides* DC. She subsequently (Freire, 1987) continued her assault on the genus by placing two recently described species (Sagástegui & Dillon, 1985) into synonymy (see discussion under individual species). We have chosen to maintain *Belloa* and remain in agreement with Cabrera (1958) and Ariza (1989), who both recognized the genus as a distinct, easily distinguishable, entity. In addition to the strikingly different pubescence of the achenes, several other important characteristics separate these two genera, including the apices of the style branches of hermaphroditic florets, pappus characteristics, and overall distribution and ecology. Initial cytological evidence also points to fundamental differences between these two genera: $n = 12$ for *Belloa punae* (Cabr.) Cabr., the only *Belloa* counted thus far, and $n = 14$ for all *Lucilia* species counted (Freire, 1986b).

Belloa is recognized by the following suite of characteristics: heterogamous capitula, pappus bristles fused at the base, style branches of hermaphroditic florets rounded or obtuse, achenes glandular with biseriate, multicellular, capitate-glandular trichomes, and probable chromosome base of $n = 12$. Suites of similar characters have been used to establish the monotypic genus *Novenia* (Freire, 1986a). In our view, *Belloa* is perhaps more closely related to *Gamochaeta* than it is to *Lucilia*. A few highly reduced *Belloa* species approach *Mniodes* in general habit; however, that genus is strictly dioecious.

A more detailed analysis and discussion of these and other differences will be published in a future work dealing with generic relationships among South American Inuleae.

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Key to Species of *Belloa*

1. Plants with stems erect or ascending, not cespitose, pulvinate, or acaulescent
2. Foliaceous stems compressed; leaves distichous, orbicular to suborbicular, folded upward, subamplexicaul *B. plicatifolia*
2. Foliaceous stems terete; leaves alternate or rosulate, oblanceolate to linear-lanceolate, plane, attenuate, and sessile 3
 3. Capitulescences glomerulate with 2–5 capitula sessile in upper leaf axils *B. lopezmirandae*
 3. Capitulescences pseudospicate, bracteate *B. turneri*
1. Plants with stems prostrate to decumbent, generally cespitose or pulvinate, or rarely acaulescent with rosulate basal leaves 4
 4. Acaulescent perennial herbs; leaves all basal, rosulate; capitula solitary, sessile or shortly pedunculate 5
 5. Leaves oblanceolate, 2–5 cm long, 6–10 mm wide, upper surfaces usually glabrescent *B. longifolia*
 5. Leaves spatulate, 2–3.5 cm long, 2–4 mm wide, both surfaces densely silvery-tomentose *B. spathulifolia*
 4. Caulescent, prostrate to decumbent, cespitose or pulvinate perennial herbs; leaves basal, rosulate and/or caulescent; capitula in glomerules or solitary, usually sessile 6
 6. Compact, cespitose habit; leaves 4–10 mm long 7
 7. Capitula solitary; leaves 4–4.5 mm long *B. schultzii*
 7. Capitula in glomerules; leaves 6–10 mm long *B. piptolepis*
 6. Branched, loosely cespitose, prostrate habit; leaves 10–50 mm long 8
 8. Leaves alternate, congested, obovate to spatulate, 10–20 mm long; capitula solitary *B. pickeringii*
 8. Leaves rosulate, oblong-linear to spatulate, (10)–20–50 mm long; capitulescences pseudospicate, capitula sessile in upper leaf axils *B. subspicata*

1. *Belloa longifolia* (Cuatr. & Aristeg.) Sagást. & Dillon, Phytologia 58: 396. 1985. **Figure 3.**

Lucilia longifolia Cuatr. & Aristeg., Fl. Venezuela 10: 367. 1964. TYPE: Venezuela, Edo. Mérida, camino a Pico Bolívar, 15 km al sudeste de Mérida, 4100–4300 m, Oct 1953, E. L. Little 15725 (holotype, VEN, not seen).

Cespitose, perennial herbs; rhizomes oblique to horizontal; roots filiform. Leaves rosulate, sessile; blade oblanceolate, 2–5 cm long, 6–10 mm wide, marcescent, base attenuate to a winged petiole, apex obtuse, mucronate, the margins entire, lower surface silvery-tomentose, upper surface densely lanate. Capitulescences of solitary heads, terminal, sessile or pedunculate, the peduncles to 5 mm long. Capitula 7.5–10 mm high, 4.5–8 mm wide; in-

volucres cylindrical to narrowly campanulate; phyllaries 4–5-seriate, the outer ovate, 4–5.5 mm long, 2.5–3 mm wide, apex obtuse, dorsally lanuginous, the inner linear, 7.5–10 mm long, 2.5–3 mm wide, apex obtuse, glabrous; pistillate florets ca. 80, the corollas 6–7 mm long; hermaphroditic florets ca. 12, the corollas ca. 6 mm long. Achenes obovate to oblong, 1–1.2 mm long, glandular; papus bristles 6–8 mm long, lutescent.

Belloa longifolia is distributed from Venezuela to southern Peru. In Peru, it is known from *jalca* and *puna* formations (3600–4000 m) in the Departments of Ancash, Cajamarca, Cuzco, and La Libertad.

ANCASH. Huaráz: Parque Nacional de Huascarán, Quebrada Alpamayo, 4600–4750 m, Smith et al. 9733

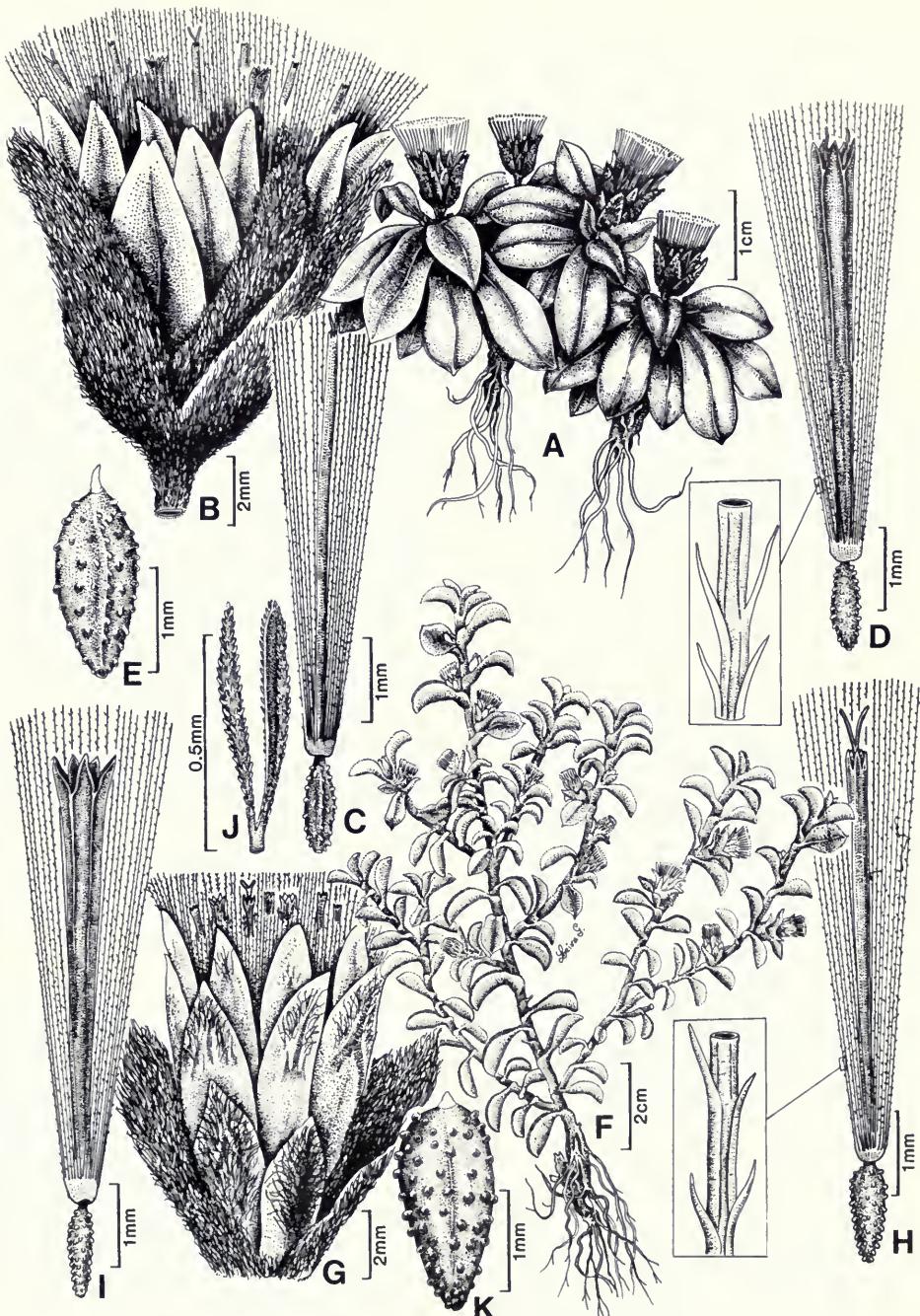


FIG. 3. *Belloa longifolia*. A, habit; B, capitulum; C, pistillate floret; D, hermaphroditic floret; E, achene. (Drawn from Sagástegui et al. 10060, HUT). *Belloa plicatifolia*. F, habit; G, capitulum; H, pistillate floret; I, hermaphroditic floret; J, style branches of pistillate floret; K, achene. (Drawn from Sagástegui et al. 10117, HUT.)

(HUT, MO, USM), Smith 10376 (HUT, MO). **Huari:** Huascarán National Park, Quebrada Pucaraju, a lateral valley to Quebrada Rurichinchay, 3900–4200 m, Smith et al. 12708 (F, MO). **Santa:** Laguna Capao, 4350 m, Mostacero

et al. 1932 (F, HUT). **AYACUCHO. Prov. Unknown:** Aucazime 10 (USM). **CAJAMARCA. Contumazá:** alrededores del Pozo Kuán, 3600–3800 m, Sagástegui et al. 10060 (F, HUT); Jalca del Pozo Kuán, 4000 m, Sagástegui

et al. 10763 (F, HUT). **San Miguel:** Taulís Alto (jalca), 3100 m, *Sagástegui et al.* 9546 (F, HUT). **CUZCO. Uru-**
bamba: Machupicchu, along Inca Trail in the pass of
Huarmiuañusca, 4205 m, *Peyton & Peyton* 279 (MO).
JUNÍN. Yauli: near Atocsayco, ca. 4200 m, *Pearsall* 837
(F). **Prov. Unknown:** Patarcocha, 4300 m, *Aguilar s.n.*
(MO, USM). **LA LIBERTAD. Pataz:** Paso de Alaska (Re-
tamas-La Paccha), 4000 m, *López & Sagástegui* 3560
(HUT, US). **Santiago de Chuco:** alrededores de Laguna El
Toro (Jalca de Quirivilca), 4000 m, *Sagástegui & Bernal*
3019 (HUT, US). **Chota:** Motil-Shorey (jalca), 3200 m,
Sagástegui et al. 11697 (F, HUT); Jalca de Coipin, 4000
m, *Sagástegui et al.* 11981 (F, HUT). **LAMBAYEQUE.**
Ferreñafe: Sinchigual-Laguna Tembladera, 3100 m, *Sa-*
gástegui et al. 12853 (F, HUT, MO, K).

2. *Belloa lopezmirandae* Cabr., Bol. Soc. Argent.
Bot. 7: 83. 1958. TYPE: Peru, Dept. La Lib-
ertad, Prov. Otuzco, Agallpampa, 3100 m, 22
May 1952, A. López M. 858 (holotype, LP;
isotype, HUT).

Lucilia lopezmirandae (Cabr.) Freire, Darwiniana, 28:
409. 1987.

Perennial herbs to 20 cm tall; stems un-
branched, ascending, cylindrical, leafy to the ap-
ices. Leaves alternate, sessile; blade oblanceolate,
1–3 cm long, 3–5 mm wide, base attenuate, apex
acute, mucronate, lower surface tomentose, upper
surface lanuginous or glabrescent. Capitulescences
glomerulate with 2–5 heads sessile in upper leaf
axils. Capitula 7–7.5 mm high, 1–1.5 mm wide;
involucres cylindrical; phyllaries 12–15, ca. 5-se-
riate, the outer ovate, 3–4 mm long, 1–1.5 mm
wide, dorsally lanuginous, apex acute, the inner
linear, ca. 7 mm long, ca. 1 mm wide, glabrous,
apex acute to subacute; pistillate florets ca. 20, the
corollas 6.5–7 mm long; hermaphroditic florets 1–
2, the corollas 5–6 mm long. Achenes obovoid,
ca. 1 mm long, brown, glandular; pappus bristles
5.5–6 mm long, white.

Belloa lopezmirandae is known from two col-
lections from open grassy sites in the region of the
type locality (3100 m). Freire (1987) placed *B.*
turneri Sagást. & Dillon into the synonymy of this
species and chose to dismiss the numerous qual-
itative and quantitative characteristics that clearly
separate these two entities.

LA LIBERTAD. OTUZO: Agallpampa, 3100 m, *López*
1864 (F, HUT).

3. *Belloa pickeringii* (A. Gray) Sagást. & Dillon,
Phytologia 58: 396. 1985.

Lucilia pickeringii A. Gray, Proc. Amer. Acad. Arts
5: 138. 1862. TYPE: Peru, Dept. Junín, Prov.
Yauli, Baños-Alpamarca, *Capt. Wilkes s.n.* (ho-
lotype, GH; isotype, US).
Lucilia pickeringii var. *β.? minor* A. Gray, Proc. Amer.
Acad. Arts 5: 138. 1862. TYPE: Peru, Dept. and
Prov. Unknown, Casa Cancha, *Capt. Wilkes s.n.*
(holotype, GH p.p.).

Prostrate perennial herbs to 5 cm tall; stems 2–
8 cm long, branched, ascending to decumbent.
Leaves alternate, sessile, congested; blade obovate
to spatulate, 1–2 cm long, 3–6 mm wide, base
attenuate, apex rounded, both surfaces densely la-
nate, incanous. Capitulescences usually of solitary
heads, terminal, sessile, rarely with 2–4 heads in
terminal glomerules. Capitula 8–9 mm high, 3–4
mm wide; involucres cylindrical; phyllaries ca. 24,
4–5-seriate, the outer ovate, 4–5 mm long, 2–3
mm wide, dorsally lanuginous, acute, the inner
linear, 7–9 mm long, 1–2 mm wide, glabrous, sub-
acute to obtuse; pistillate florets 40–60, the corol-
las 4–5 mm long; hermaphroditic florets ca. 10,
the corollas 3–4 mm long. Achenes (immature)
oblong, 0.8–1 mm long, brownish, glandular; pap-
pus bristles ca. 5 mm long, white.

Belloa pickeringii is found infrequently in high-
elevation *puna* formations (3600 m) from central
to southern Peru.

CUZCO. Cuzco: Cuzco, 3600 m, *Herrera* 2397 (F).
JUNÍN. Tarma: 25 km W of Tarma, 4100 m, *Hutchison*
659 (UC). **LIMA. Huarochiri:** Río Blanco, 12,000 ft,
Macbride & Featherstone 705 (F, US).

4. *Belloa piptolepis* (Wedd.) Cabr., Bol. Soc. Ar-
gent. Bot. 7: 81. 1958.

Merope piptolepis Wedd., Chlor. And. 1: 162. 1856.
SYNTYPES: Peru, Dept. Puno, Maravillas, *H. A.*
Weddell 4514 (lectotype, P, designated by Ca-
brera, 1978). Bolivia, Dept. Potosí: "aux environs
des lagunas," *A. C. V. d'Orbigny* 1371 (paralec-
totype, P, not seen, fragment, F; isoparalectotype,
G, not seen, F neg. 28611).

Lucilia piptolepis Wedd., Chlor. And. 1, t. 26 B, 1855.
Gnaphalium piptolepis (Wedd.) Griseb., Abh. Königl.
Ges. Wiss. Göttingen. 24: 186. 1879.

Compact cespitose, perennial herbs to 5 cm tall;
rhizomes oblique, roots filiform; stems 5–40 cm
long, decumbent, tomentose to glabrate. Leaves
rosulate, sessile; blade obovate-spatulate to obo-
vate-oblong, 6–10 mm long, 3–4 mm wide, mar-
cescent, base attenuate, apex obtuse, mucronulate,
both surfaces tomentose, incanous. Capitules-

ences glomerulate, sessile, terminal, occasionally of solitary heads. **Capitula** ca. 6 mm high, ca. 4 mm wide; involucres narrowly campanulate; phyllaries ca. 18, ca. 3-seriate, the outer ovate-oblong, 3–4 mm long, 1–1.5 mm wide, lanuginous, obtuse, the inner linear, ca. 6 mm long, ca. 1 mm wide, glabrous, obtuse; pistillate florets 18–20, the corollas ca. 4 mm long; hermaphroditic florets 2–5, the corollas 3.5–4 mm long. Achenes ellipsoid, 0.7–0.8 mm long, brown, glandular; pappus bristles ca. 5 mm long, white.

Belloa piptolepis is distributed from Venezuela to northwestern Argentina. In Peru it occupies a wide range of habitats within *puna* and *jalca* formations and is normally found above 3500 m.

The overall habit varies considerably with the smallest individuals found in southern Peru, and the larger, to the north. *Belloa piptolepis* most closely resembles *B. subspicata*, but the former generally has a more compact habit, smaller leaves, slightly broader capitula, and smaller achenes. In addition, the capitulescence of *B. piptolepis* is composed of terminal capitula subtended by foliaceous bracts, whereas that of *B. subspicata* is pseudospicate, with axillary capitula subtended by the upper leaves. Individuals from northern Peru (e.g., Dillon & Skillman 4127) often have a more open habit that approaches *B. subspicata*, but conform in all other characters to the species delineation presented here. Further sampling in this region will be necessary to assess variability in habit.

ANCASH. Bolognesi: Chiquián, 3840–3860 m, Ferreyra 5768 (US, USM). **Carhuáz:** Huascarán National Park, Quebrada Ishinca, 4730–4930 m, Smith et al. 9459 (MO, USM); Quebrada Ulta, 4400–4600 m, Smith 11354 (F, MO). **Huaráz:** Huascarán National Park, Quebrada Llaca, 4400–4600 m, Smith et al. 10806 (F, MO). **Huari:** Tunel Kahuish, 4250 m, López et al. 7569 (HUT, MO); Huascarán National Park, Quebrada Rurichinchay between Mina Esparta at Quebrada Pachachaca, 3700–4060 m, Smith et al. 12658 (F, MO). **AYACUCHO. Huanta:** Pampalca, between Huanta and Río Apurímac, ca. 3200 m, Killip & Smith 23265 (NY). **Santa:** Laguna Capao, 4400 m, Mostacero et al. 1942 (F, HUT, MO). **CAJAMARCA. Chota:** Laguna Yahuarcocha, arriba de Incahuasi, 3600 m, Sagástegui et al. 12906 (F, HUT, K, LP, MO). **Contumazá:** Jalca del Pozo Kuán, 4000 m, Sagástegui et al. 10764, 10791 (F, HUT, MO). **CUZCO. Cuzco:** 5 km N of Cuzco, 3700 m, West 7165 (GH, UC). **JUNÍN. Junín:** between Tarma and Jauja, ca. 4500 m, Killip & Smith 21962 (NY). **Yauli:** Yauli, ca. 13,500 ft, Macbride & Featherstone 931 (F, GH). **Prov. Unknown:** Patarcocha, 4300 m, Aguilar s.n. (USM). **LA LIBERTAD. Patáz:** Huancaspata-Tayabamba, 3900 m, López & Sagástegui 8267 (HUT, MO). **Santiago de Chuco:** Jálca de Coipin,

4000 m, Sagástegui et al. 11980 (F, HUT, MO, NY, US). **LAMBAYEQUE. Ferreñafe:** ca. 7 km NW of Incahuasi; near Cerro Punamachay on trail to Laguna Hualtaco, 3300–3550 m, Dillon & Skillman 4127 (F). **MOQUEGUA. Mariscal Nieto:** ca. 77 km NE of Moquegua on road to Carumus (Km 80), ca. 4050 m, Dillon et al. 4812 (F, USM). **PUNO. Azángaro:** Arapa, 3900 m, Aguilar s.n. (USM p.p.); Arapa, Aguilar 130 (MO p.p.); Tequena, 20 km N de Arapa, Aguilar 418 (USM p.p.). **Huancané:** Moho, 4000 m, Aguilar s.n. (USM); Granja Salcedo, Cañón Vis cachani, 4500 m, Mexia 4262 (GH, MO, UC); Melgar: Chuquibambilla, 3900–4000 m, Pennell 13368 (GH, F, NY); Araranca, 4100–4300 m, Pennell 13437 (F, NY). **Puno:** Amantaní, 3900 m, Aguilar 427 (MO p.p., USM).

5. *Belloa plicatifolia* Sagást. & Dillon, Phytologia 58: 394. 1985. TYPE: Peru, Dept. Cajamarca, Prov. Contumazá, Cascabamba, arriba de Contumazá, ladera, 3200 m, 14 Jun 1981, A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10117 (holotype, HUT; isotype F, HUT, K, MO). Figure 3.

Lucilia plicatifolia (Sagást. & Dillon) Freire, Darwiniana, 28: 411. 1987.

Perennial herbs to 5–20 cm tall; stems branched, erect to ascending, leafy to the apex. Leaves alternate, distichous, sessile; blade orbicular to suborbicular, 5–14 mm long, 3–7 mm wide, marcescent, folded, base attenuate, subamplexicaul, apex rounded, both surfaces densely lanate, the margins entire. Capitulescences of solitary heads in upper leaf axils, subsessile. **Capitula** (6–)7–8(–9) mm high, 3–4 mm wide; involucres cylindrical; phyllaries 15–20, 4–5-seriate, the outer ovate, 4–6 mm long, 3–4 mm wide, apex subacute, dorsally lanuginous, the inner linear to lanceolate, 7–8 mm long, 1–1.5 mm wide, apex acute, glabrous; pistillate florets 12–14, the corollas 4–5 mm long; hermaphroditic florets ca. 10, the corollas 4–5 mm long. Achenes obovate to oblong, 1–1.5 mm long, brown, glandular; pappus bristles 5–6 mm long, white.

Belloa plicatifolia is found frequently among sheltered rocky sites in *jalca* formations of northern Peru (Departments of Cajamarca and La Libertad, 3000–3500 m).

This species is morphologically distinct and has no apparent close relatives. Its erect lanate branches with folded, distichous leaves give the stems a flattened appearance unknown elsewhere in the genus.

CAJAMARCA. Cajabamba: Cajabamba-Luchubamba, 3800 m, Sagástegui et al. 11199 (F, HUT, K, MO, NY,

USM). **Cajamarca:** Cumbemayo, 3200 m, *Sagástegui & Tellez* 12686 (F, HUT, MO). **Contumazá:** Cascabamba, 3050 m, *Sagástegui et al.* 9022 (F, HUT, MO); Cascabamba, 3100 m, *Sagástegui et al.* 10010 (F, HUT, K, MO); Cascabamba, 3000 m, *Sagástegui et al.* 10719 (F, HUT, K, MO). **LA LIBERTAD. Otuza:** Salpo, Cerro Ragache, 3500 m, *Sagástegui et al.* 11631 (F, HUT, K, MO).

6. *Belloa schultzii* (Wedd.) Cabr., Revista Invest. Agríc. 11: 404. 1957.

Merope schultzii Wedd., Chlor. And. 1: 163. 1856.
TYPE: Peru, Dept. Puno, Prov. Carabaya, Aya-pata, W. Lechler 1984 (holotype, P, not seen, F neg. 37608).

Compact, cespitose, perennial herbs; stems much-branched, 2–3 cm long, compacted. Leaves sessile, densely imbricate; blade obovate, 4–4.5 mm long, 2–2.5 mm wide, marcescent, base attenuate, subamplexicaul, apex rounded, both surfaces densely lanate, gray. Capitulescences of solitary heads, terminal, sessile. Capitula 4–4.5 mm high, 1.5–2 mm wide; involucres cylindrical; phyllaries ca. 18, 4-seriate, the outer ovate, 2–3 mm long, 1–1.5 mm wide, dorsally lanuginous, acute, the inner linear, 4–4.5 mm long, 1–1.5 mm wide, glabrous, apex subacute, purplish; pistillate florets 9–11, the corollas 3–3.5 mm long; hermaphroditic florets 1–3, the corollas 2.5–3 mm long. Achenes (immature) oblong, 0.6–0.8 mm long, brown, sparsely glandular; pappus bristles ca. 4 mm long, white.

Belloa schultzii is distributed from southern Peru to northern Chile and adjacent northwestern Argentina in dry *puna* habitats usually above 4000 m. It is distinctive among the Peruvian members of the genus in possessing a tightly compact habit, densely imbricate leaves, capitula only 4–4.5 mm high, and sparsely glandular achenes. Superficially, its overall habit approaches that of *Mniodes*, but it is readily distinguished by its heterogamous capitula.

Freire (1987) placed *Mniodes cerratei* Ferreyra under the synonymy of *B. schultzii* (as *Lucilia*). Sagástegui and Dillon (1985) recognized the type as a species of *Belloa* and will follow Freire's suggestion until further material can be examined.

AREQUIPA. Arequipa: Nevado de Chachani, 4300–4600, *Pennell* 13310, 13311 (F, NY); Pichupichu, 13,500 ft, *Stafford* 697 (F). **CUZCO. Quispicanchis:** Auzangate, 4300–4600, *Rauh & Hirsch* P1190 (NY). **JUNÍN. Yauli:** Tucto, cerca a Morococha, 4800–4900 m, *Weberling* 5915 (USM). **LIMA. Huarochirí:** ca. 1 km from Casa-

palca-Marcapomacocha, ca. 15,000 ft, *Saunders* 807 (NY). **MOQUEGUA. Mariscal Nieto:** between Torata and Carumas, Km 75–76 from Moquegua to Puno, ca. 3600 m, *Dillon et al.* 3346A (F, HUT, K, MO, NY, US, USM). **PUNO.** Puno: San Antonio de Esquilache, 15,500 ft, *Stafford* 746 (F). **Prov. Unknown:** Casa Cancha, *Wilkes s.n.* (GH p.p., NY).

7. *Belloa spathulifolia* Sagást. & Dillon, Phyto-
logia 58: 394. 1985. TYPE: Peru, Dept. La
Libertad, Prov. Santiago de Chuco, entre
Chota Motil y Shorey, jalca, 3200 m, 6 Dec.
1984, A. Sagástegui A., J. Mostacero L. & M.
Diestra Q. 11695 (holotype, HUT; isotypes, F,
MO, NY). **Figure 4.**

Cespitose, perennial herbs to 3 cm tall; rhizomes oblique, roots filiform. Leaves rosulate, sessile; blade spatulate to oblanceolate-spatulate, 2–3.5 cm long, 2–4 mm wide, coriaceous, marcescent, the base expanded and partially sheathing the stem, both surfaces densely silvery-tomentose, the margins entire. Capitulescences 2–3-headed, sessile glomerules or, rarely, of solitary heads. Capitula 7–8 mm high, ca. 5 mm wide; involucres narrowly campanulate; phyllaries ca. 24, 4-seriate, the outer ovate, ca. 4 mm long, ca. 2 mm wide, lanuginous, apex obtuse, the inner linear-oblong, 7–8 mm long, ca. 2 mm wide, glabrous, apex obtuse; pistillate florets 15–16, the corollas ca. 4 mm long, the style branches exserted; hermaphroditic florets ca. 10, the corollas ca. 5 mm long. Achenes obovate to oblong, ca. 1 mm long, brown, glandular; pappus bristles ca. 4 mm long, white.

Belloa spathulifolia is known only from the type locality in open spaces between clumps of *Stipa ichu* within the *jalca* formation (ca. 3200 m). Among the Peruvian species, it most closely resembles *B. longifolia* with its cespitose, rosulate habit; however, the latter has much wider leaves (6–10 mm) and larger capitula with more pistillate florets (ca. 80). Freire (1987) placed *B. spathulifolia* under the synonymy of *Lucilia (Belloa) san-tanica* (Cabr.) Freire, choosing to ignore the differences in habit, capitulecence, floral number, and ecological and geographic preferences (Sagástegui & Dillon, 1985).

8. *Belloa subspicata* Wedd., Chlor. And. 1: 159.
1855. TYPE: Bolivia, Dept. Potosí, "aux en-
viron de Potosí," A. C. V. d'Orbigny 1373,
1374 (holotype, P, not seen, F neg. 38022).

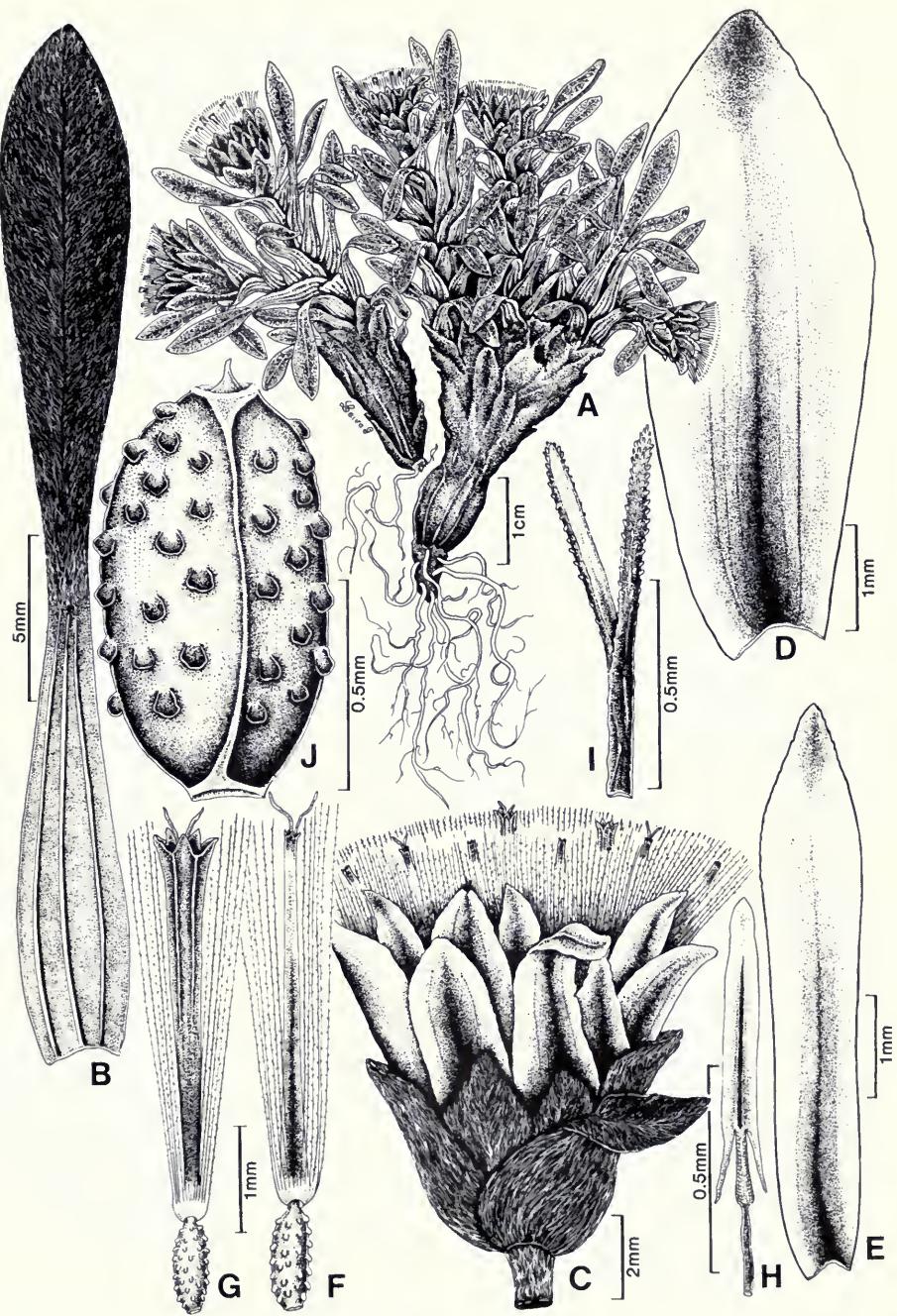


FIG. 4. *Belloa spathulifolia*. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, anther; I, style branches of pistillate floret; J, achene. (Drawn from Sagástegui et al. 11695, HUT.)

Prostrate, perennial herbs to 5 cm tall; roots fibrous; stems numerous from caudex, 2–7 cm long, prostrate, decumbent, or ascending, lanulose. Basal leaves sessile, rosulate, oblong-linear to spatul-

late-oblong, (1–)2–5 cm long, 2–7 mm wide, base attenuate, apex acute to obtuse, lower surface densely tomentose, upper surface lanuginous, the cauline leaves gradually smaller. Capitulescences

pseudospicate, heads sessile in upper leaf axils or, rarely, of terminal, solitary heads. **Capitula** 6–8 mm high, 2–3 mm wide; involucres cylindrical; phyllaries ca. 14, 4-seriate, the outer ovate, 3–4 mm long, 1–1.5 mm wide, lanuginous, acute to subacute, the inner oblong-linear, 7–8 mm long, 1–1.5 mm wide, glabrous, acute to obtuse, brownish; pistillate florets 14–20, the corollas 4–5 mm long; hermaphroditic florets 3–6, the corollas ca. 5 mm long. **Achenes** oblong, ca. 1 mm long, brownish, glandular; pappus bristles ca. 6 mm long, white.

Belloa subspicata is distributed from northern Peru to northwestern Argentina. Within its range this species is polymorphic for leaf shape: collections from the north usually have spatulate to oblong leaves with obtuse to rounded apices (rarely acute), and those from the south have more oblong-linear leaves and acute apices. These morphs may prove to be worthy of taxonomic recognition; however, further collections and field observations are needed.

This species most closely resembles *Belloa piptolepis*; however, it may be separated by the former's larger leaves, cylindrical involucres, and more pseudospicate capitulescences. The overall size of the achenes varies considerably, but those in *B. piptolepis* tend to be smaller than those of *B. subspicata*.

CAJAMARCA. Contumazá: El Granero, 2800 m, Sagástegui & López 10640 (F, HUT, MO). **CUZCO.** Canas: San Andrés de Checca, 3870 m, Vargas 11002 (F, UC), Vargas 1479 (GH p.p.). **HUÁNUCO.** Huánuco: San Carlos Mines, estación 6 mi W of Huallanca, Macbride & Featherstone 2467 (F). **JUNÍN.** Jauja: Muquiyauyo, Río Mantaro, 3500 m, s.d. (F, USM). Tarma: road from Huancayo to Tarma, 3000–3300 m, Sullivan, et al. 1043 (F, MO). **LA LIBERTAD.** Santiago de Chuco: Laguna El Toro, 4100 m, Sagástegui 3020 (HUT, US). **LIMA.** Huarochirí: Viso, ca. 9000 ft, Macbride & Featherstone 614, 615 (F); Río Blanco, ca. 12,000 ft, Macbride & Featherstone 704, 741 (F), 742 (F, US). **PUNO.** Carabaya: between Santa Rosa and Ayaviri; ca. 3500 m, Dillon, et al. 1070 (F, MO, USM). **Melgar:** Chuquibambilla, 3900–4000 m, Pennell 13369 (F); Araranca, 4100–4300 m, Pennell 13471 (F). **NO EXACT LOCALITY.** Ellenberg 613 (USM).

Perennial **herbs** to 20 cm tall; stems erect, unbranched, cylindrical, densely sericeous-lanose. Basal leaves rosulate, sessile; blade oblong-lanceolate to linear-lanceolate, 2–4 cm long, 3–5 mm wide, coriaceous, marcescent, discolorous, base attenuate, apex acute, mucronulate, parallel-nerved, lower surface silvery-tomentose, upper surface lanuginous; caudine leaves alternate, sessile; blade linear to lanceolate, 1–3 cm long, 1.5–3 mm wide. **Capitulescences** spiciform, bracteate. **Capitula** 5–6 mm high, 5 mm wide; involucres campanulate; phyllaries ca. 25, ca. 4-seriate, the outer ovate, 3.5–4.5 mm long, 2.5–3.5 mm wide, lanuginous, apex acute, the inner linear to oblong-linear, 5–6 mm long, 1–2 mm wide, apex acute, glabrous; pistillate florets 25–40, the corollas ca. 3.5 mm long; hermaphroditic florets (7–)10–12, the corolla 3–3.5 mm long. **Achenes** oblong, ca. 1 mm long, brownish, glandular; pappus bristles ca. 4 mm long, white.

Belloa turneri occurs frequently in open areas within *jalca* formations in northern Peru (Departments of Ancash and Cajamarca, 3100–3800 m) and southern Ecuador (Province of Loja, 2400–2600 m).

This species is distinctive within the genus, bearing rosulate basal leaves and robust, erect, spiciform capitulescences. It most closely resembles *B. lopezmirandae* Cabr. of Department La Libertad; however, the latter has smaller capitula with cylindrical involucres and fewer florets (ca. 20 pistillate, 1–2 hermaphroditic). It is known by the local name of *champito* in Ancash.

ANCASH. Huaráz: Cerro San Cristóbal, 3800 m, Evangelista s.n. (F, HUT, MO); Huarí: Huascarán National Park, passing Manto Mina, 4.8 km from Catac-Chavín road, 4410 m, Smith & Buddensiek 10988 (MO); 1 km below Manto Mina, 4300 m, Smith & Buddensiek 11011 p.p. (F). **CAJAMARCA.** Contumazá: Pampa de la Sal, 3500 m, Sagástegui, et al. 10731 (F, HUT, MO); San Miguel: Taulis Alto (jalca), 3100 m, Sagástegui, et al. 9547 (F, HUT, MO). **LA LIBERTAD.** Santiago de Chuco: Chota (Motil-Shorey), 3200 m, Sagástegui, et al. 11693 (F, HUT, MO).

IV. Blumea

Blumea DC., Arch. Bot. (Paris) 2: 514. 1833, nom. cons. TYPE: *Conyzia balsamifera* L. ≡ *Blumea balsamifera* (L.) DC.

Annual or perennial or rarely biennial **herbs** or shrubs; stems erect, ascending or occasionally pro-

9. ***Belloa turneri* Sagást. & Dillon**, Phytologia 58: 392. 1985. TYPE: Peru. Dept. Cajamarca. Prov. Contumazá: alrededores del Pozo Kuán, ladera, 3600–3800 m, 13 Jun 1981, A. Sagástegui A., E. García A., S. López M. & J. Mostacero L. 10087 (holotype, HUT; isotypes, F, HUT, MO, TEX). **Figure 5.**

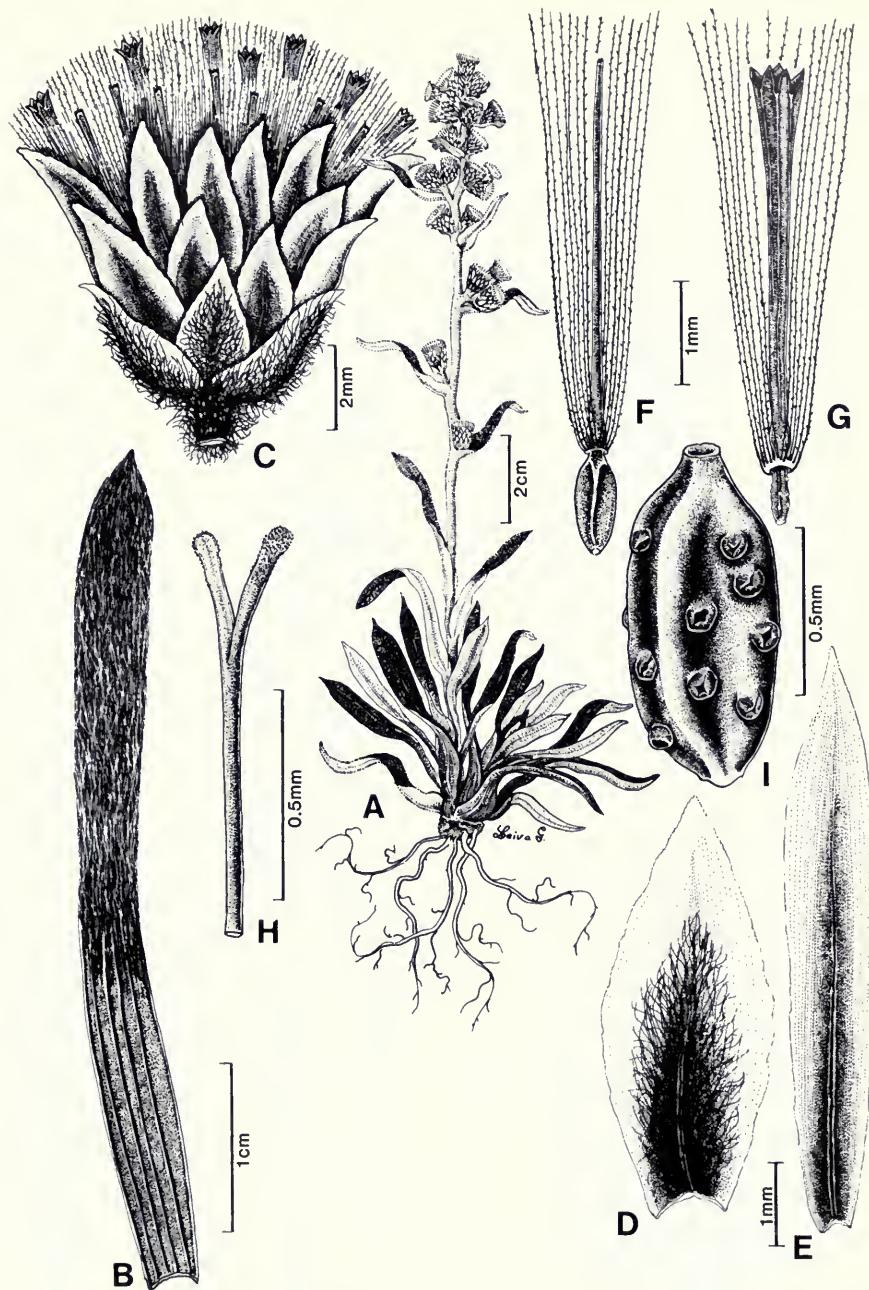


FIG. 5. *Belloa turneri*. A, habit; B, leaf (underside); C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret; H, style branches of hermaphroditic floret; I, achene. (Drawn from Sagástegui et al. 10087, HUT.)

cumbent or climbing. Leaves alternate, simple; petiole wanting or short, sometimes decurrent on the stem; blade base rounded, amplexicaulous, or attenuate, often glandular-pubescent, the margins entire, toothed, or pinnately or runcinately lobed.

Capitulescences paniculate or of solitary heads (rarely glomerulate), terminal or axillary, sessile or pedunculate, bracteolate or not. Capitula disciform, 3–18 mm in diameter; involucres hemispherical to cylindrical; phyllaries imbricate, mul-

tiseriate, dorsally pubescent, the margins scarious; receptacles flat or convex, epaleaceous, puberulent to pilose; pistillate florets numerous, the corollas filiform, mostly yellowish white, apex 2–4-lobed or bilabiate, the style sometimes conspicuously exserted; hermaphroditic florets fertile or functionally staminate, the corollas tubular, the limb slightly expanded, (4–)5-lobed, the anther bases sagittate, caudate, the terminal appendages variously shaped, the styles bifid, the branches slender, strigose to papillose. Achenes small, brown, oblong, 5–10-ribbed, plump, terete or obscurely 4-angled; pappus bristles scabrid, barbellate, unisexual. Chromosome numbers: $n = 9, 10, 11, 18, 22, 27$.

Blumea is a tropical and subtropical genus containing some 75 species, from Africa, Asia, Australia, and the Pacific Islands. Only the following species is known from the New World. *Blumea* is placed within the Plucheinae, which is characterized by alternate leaves, heterogamous capitula (either ligulate or disciform) with predominately yellow corollas, and sagittate or caudate anthers (Randeria, 1960). Its nearest Peruvian relative is *Pluchea*, a genus possessing a more shrubby habit, corymbose capitulescences, more coriaceous phyllaries, and functionally staminate central florets with undivided styles.

References

- BADILLO, V. M. 1974. *Blumea viscosa* y *Piptocarpha cuatrecasiana*, dos nuevas combinaciones en Compositae. Revista Fac. Agron. (Maracay), 7: 9–16.
 MCVAUGH, R. 1972. Nomenclatural and taxonomic notes on Mexican Compositae. Rhodora, 54: 495–516.
 RANDERIA, A. J. 1960. The composite genus *Blumea*, a taxonomic revision. Blumea, 10: 176–317.

1. ***Blumea viscosa* (Miller) Badillo, Revista Fac. Agron. (Maracay) 7(3): 9. 1974. Figure 6.**

Conyzia viscosa Miller, Gard. Dict., ed. 8. 1768. TYPE: Mexico, Veracruz, W. Houston s.n. (holotype, BM, not seen).

Conyzia lyrata Kunth, Nov. Gen. Sp. (fol.) 4: 55. 1820. TYPE: Ecuador, Guayaquil, A. Humboldt & A. Bonpland 3812 (holotype P, not seen, IDC Microfiche 6209, 95: II, 5; isotype, B, probably destroyed, F neg. 14934).

Eschenbachia lyrata (Kunth) Britton & Millsp., Fl. Baham. 444. 1920.

Blumea lyrata (Kunth) Badillo, Bol. Soc. Venez. Ci. Nat. 10: 257. 1946.

Ernstia lyrata (Kunth) Badillo, Cat. Fl. Venez. 505. 1947, genus ined.

Pseudoconyzia lyrata (Kunth) Cuatr., Ciencia (Mexico), 21: 31. 1961.

Pseudoconyzia viscosa (Miller) D'Arcy, Phytologia 25: 281. 1973.

Blumea viscosa (Miller) D'Arcy, Phytologia 30: 5. 1975, redundant comb.

Herbs to 8 dm tall; stems erect, terete, striate, sparsely pilose and glandular-puberulent, viscid. Leaves sessile, simple or divided into stipuleform auricles; blade obovate to spatulate, 1–3(–7) cm long, 0.5–1(–3.5) cm wide, base attenuate, apex acute, mucronate, the margins dentate, the teeth mucronate, both sides sparsely pilose and glandular-puberulent. Capitulescences cymose-paniculate, subtended by a foliaceous bracts; peduncles 1–4 cm long, glandular-puberulent, usually bracteolate. Capitula 5–7 mm high, 4–5 mm wide; involucres narrowly campanulate; phyllaries 3–4-seriate, the outer lanceolate, 1.5–3 mm long, ca. 0.5 mm wide, pilose and glandular-puberulent, apex acute, the inner to 6 mm long, ca. 0.7 mm wide, glandular-puberulent, apex acuminate, strigulose; receptacle flat to depressed-hemispheric, 3–4 mm in diameter, puberulent to glabrescent; pistillate florets 50–300, the corollas ca. 3.5–4 mm long, yellowish-white, slightly expanded at the base, apex 3-notched, the style 4–4.5 mm long, the branches filiform, 0.4–0.5 mm long; hermaphroditic florets 2–12, fertile, the corollas white or pinkish, tubular, 5–5.5 mm long, the limb slightly expanded, 5-lobed, the lobes ca. 0.4 mm long, narrowly triangular, the anthers ca. 1.2 mm long, caudate, the terminal appendages oblong, apex rounded, the style 5–5.8 mm long, the branches cylindrical, 0.2–0.3 mm long, strigillose. Achenes fusiform, 0.8–1 mm long, ribbed, strigillose, dark brown; pappus of ca. 10 bristles, ca. 4.5 mm long, white, persistent, not deciduous together as a unit.

Blumea viscosa is distributed in litoral habitats throughout the Caribbean region and along the western coast of South America from Colombia to northern Peru. It is apparently rare in Peru and represented by only two recent collections.

This species superficially resembles *Conyzia* (Astereae), but is readily distinguished from all Peruvian members of that genus by its dentate leaves, tailed anthers, and coastal habitat preference.



FIG. 6. *Blumea viscosa*. A, flowering branch; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, style branches of hermaphroditic floret; H, stamen; I, achene. (Drawn from Sagástegui & Mostacero 11361, HUT.)

McVaugh (1972) recognized two varieties of *Blumea viscosa*, a pale-pilose form, based on Mexican material (Veracruz, Houston, BM), and a much less hairy form with more conspicuous glands, based

on Ecuadorian material (Guayaquil, Humboldt & Bonpland, p). Badillo (1974) considered this taxon to be one highly variable species, and this concept is followed in the present treatment.

CAJAMARCA. Contumazá: Ascope-San Benito, 500 m, Sagástegui & Mostacero 11361 (HUT, MO). **LAMBAYEQUE.** Lambayeque: Motupe (Anchoviera), 50 m, Llatas 1012 (F, PRG).

V. Chevreulia

Chevreulia Cass., Bull. Soc. Philom. Paris 1817: 69. 1817. TYPE: *Tussilago sarmentosa* Pers. = *Chevreulia sarmentosa* (Pers.) Blake.

Perennial herbs; stems rhizomatous. Leaves rosulate or opposite, the margins entire. Capitulescences of solitary heads, long-pedunculate at maturity. Capitula disciform; involucres cylindrical to campanulate; phyllaries 3–5-seriate, imbricate, scarious, hyaline, the outer gradually smaller; receptacles plane, naked; pistillate florets 1–2-seriate, the corollas filiform, white or violet, apex truncate or dentate; disc florets hermaphroditic, the corollas narrowly tubular, 5-lobed, the anthers sagittate, caudate, the terminal appendages ovate, the style branches truncate, dorsally papillose. Achenes fusiform, contracted into a filiform rostrum, asperous; pappus bristles capillary, scabrid, barbellate, 1–2-seriate, the bases fused. Chromosome number: $n = 14$.

A genus of some six species distributed throughout South America. Only the following species is recorded for Peru.

1. **Chevreulia acuminata** Less., Linnaea 5: 261. 1830. TYPE: Brazil, Rio de Janeiro, Serra dos Orgaos, Jan 1828, H. K. Beyrich s.n. (P, holotype, not seen). Figure 7.

Chevreulia filiformis Hook. & Arn., Companion Bot. Mag. 1: 102. 1836. TYPE: Brazil, St. Catherine's, J. Tweedie s.n. (holotype, GL, not seen).

C. longipes Wedd., Chlor. And. 1: 157. 1856. TYPE: Peru, Dept. Cuzco, 1839–40, C. Gay s.n. (holotype, P, not seen).

Creeping, perennial herbs; stems to 8 cm long, much-branched, densely foliaceous, procumbent, laxly lanate. Leaves decussate, sessile; blade oblong-lanceolate, 5–15 mm long, 1–4 mm wide, apex acuminate, mucronate, the lower surface densely lanate, the upper surface lanuginous to glabrescent, the margins revolute. Capitulescences of sol-

itary heads at tips of branches, sessile during anthesis, the peduncles elongating with maturity of fruit, to 6–(12) cm long. Capitula 8–10 mm high, ca. 3 mm wide; involucre cylindrical; phyllaries ca. 3-seriate, the outer lanceolate 3–5 mm long, ca. 1 mm wide, dorsally lanuginous, apex acute, the inner linear-oblong to linear, 7–8 mm long, 0.4–0.6 mm wide, glabrous, apex obtuse; pistillate florets 10–12, the corollas ca. 3.5 mm long; hermaphroditic florets ca. 4, the corollas ca. 4 mm long. Achenes ca. 2 mm long; pappus bristles ca. 3.5 mm long.

Chevreulia acuminata is distributed from Ecuador to northern Argentina and Brazil. In Peru, it is represented by only three collections. It is a distinctive species with greatly elongating peduncles and rostrate achenes, features unknown in any other Peruvian Inuleae.

AMAZONAS. Rodríguez de Mendoza, 1700 m, Woytkowski 8082 (MO). **HUÁNUCO.** Huánuco: Mito, ca. 9000 ft, Macbride & Featherstone 1723 (F, GH); Chasqui, ca. 10,500 ft, Macbride & Featherstone 2457 (F).

VI. Cuatrecasasiella

Cuatrecasasiella H. Robinson, Flora Neotropica 39: 14. 1986. TYPE: *Luciliopsis isernii* Cuatr. = *Cuatrecasasiella isernii* (Cuatr.) H. Robinson.

Annual or perennial herbs, dioecious; stems cespitose or prostrate. Leaves opposite, decussate, sessile to subsessile; blade oblong, apex rounded or subtruncate, the margins entire. Capitulescences of solitary heads, terminal on branchlets. Capitula discoid; involucres ovoid or campanulate to cylindrical; phyllaries 2–3-seriate, imbricate, hyaline; receptacles plane, naked; florets in masculine capitula 5–14, the corolla tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the ovary sterile, the style branches rounded; florets in feminine capitula 8–15, the corolla filiform, 2–4-lobed. Achenes cylindrical, brown, glabrous; pappus bristles scabrid, barbellate, uniseriate, the bases fused, deciduous together as a unit, white to reddish brown.

A genus of four species distributed from Ecuador to Argentina in high-elevation habitats. Only one species is known from Peru.

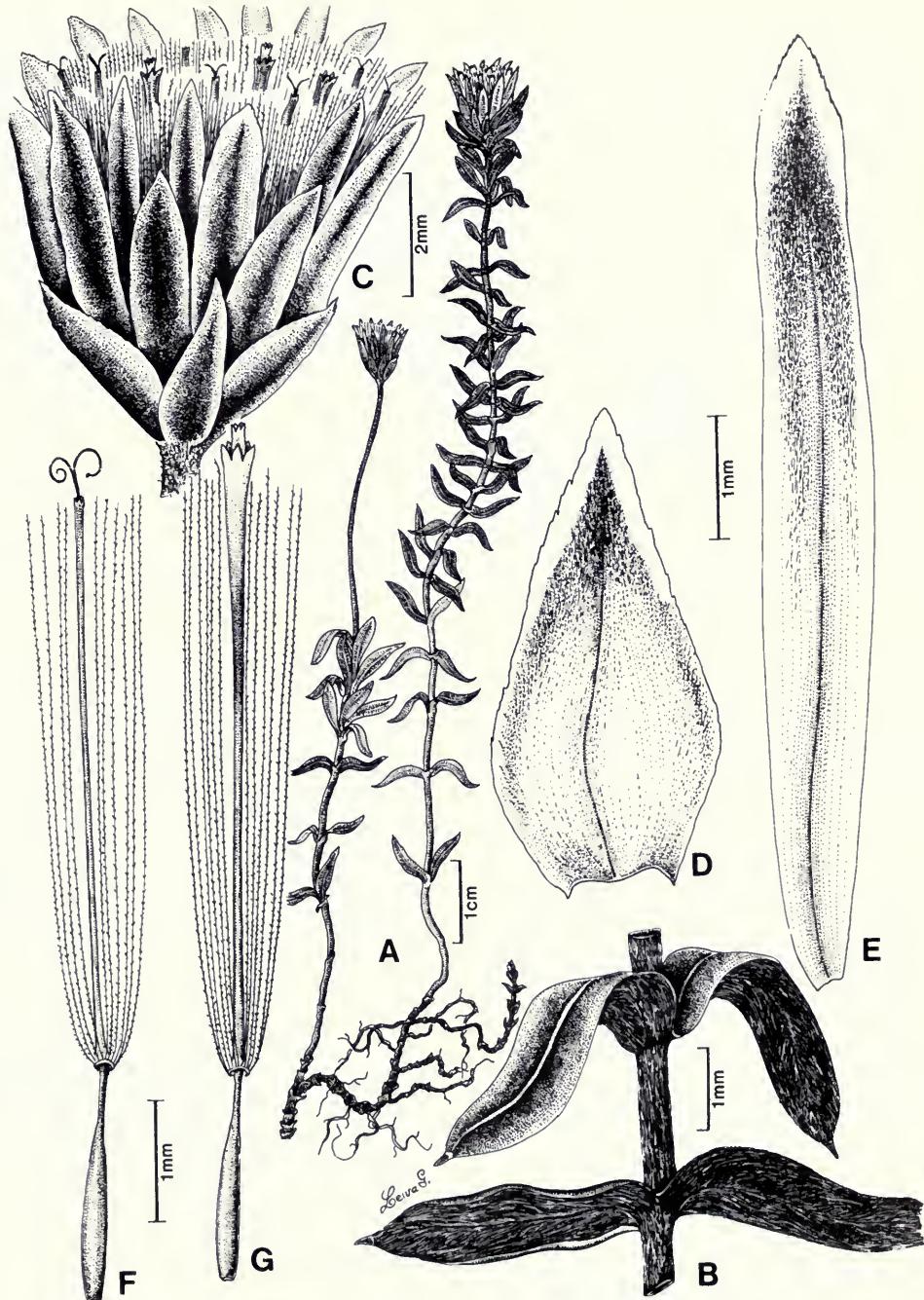


FIG. 7. *Chevreulia acuminata*. A, habit; B, enlargement of stem section; C, capitulum; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermaphroditic floret. (Drawn from Macbride & Featherstone 1723, f.)

Robinson (1986) established *Cuatrecasasiella* for species previously placed in *Luciliopsis* Weddell (*Chloris Andina* 1: 159–160. 1856; pl. 26A. 1855). He observed that the type species of *Lu-*

ciliopsis is not dioecious and lacks opposite leaves throughout, and suggested that *Luciliopsis perpusilla* Wedd. is based on a small individual of *Facelis plumosa* (Wedd.) Schultz-Bip.

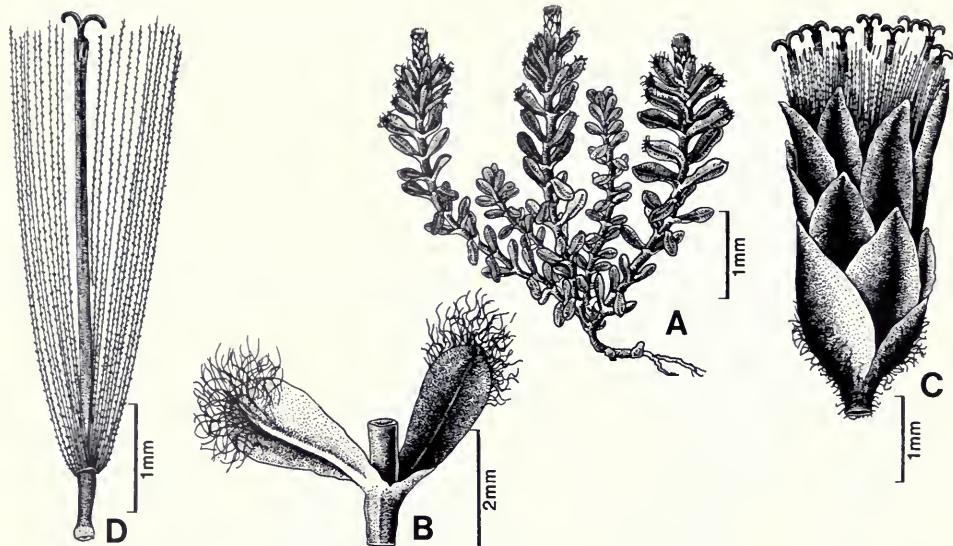


FIG. 8. *Cuatrecasasiella isernii*. A, habit; B, enlargement of leaves; C, feminine capitulum; D, pistillate floret. (Drawn from Dillon 2517, HUT.)

References

ROBINSON, H. 1986. Cuatrecasas Festschrift—In Honor of the Botanical Career of José Cuatrecasas. *Flora Neotropica*, 39: 13–16.

1. *Cuatrecasasiella isernii* (Cuatr.) H. Robinson, *Flora Neotropica*, 39: 15. 1986. Figure 8.

Luciliopsis isernii Cuatr., *Anal. Univ. Madrid* 4: 28. 1935. TYPE: Ecuador, Prov. Napo, páramo Jaucupampa, Cerro Antisana, Jan 1865, J. Isern 70 (probably MA, not seen).

Perennial herbs; stems much-branched, 3–5 cm long. Leaves sessile; blade oval to ovate or oblong, 2–3 mm long, 0.6–2 mm wide, marcescent, apex obtuse to rounded, often with a tuft of tomentum persisting, lower surface arachnoid-tomentose to glabrescent, upper surface glabrous. Capitula 3–5 mm high, 1–1.5 mm wide; involucres cylindrical; phyllaries 3-seriate, stramineous, hyaline, the outer ovate, ca. 2 mm long, 0.5–0.7 mm wide, arachnoid-tomentose dorsally, apex obtuse, the inner oblong to linear, ca. 4 mm long, ca. 1 mm wide, glabrous, apex acute to obtuse; florets in masculine capitula ca. 8, the corolla ca. 3 mm long, the anthers ca. 1 mm long; florets in feminine capitula ca. 15, the corolla 3.2–3.5 mm long. Achenes (immature), 0.5 mm long, brown, glabrous; pappus bristles ca. 4 mm long.

This species is known from high-elevation localities in Ecuador and Peru, 4100–4700 m. The collection from Junín (Dillon 2517) was found growing within moist hummocks of a *Distichia muscoides* moor at the south end of Lago Junín. No male individuals were found in this population. Conversely, the two collections from Ancash (Bernardi et al. 16591, Smith 11431) appear to contain only male individuals. Additional field observations are necessary to ascertain if entire populations are actually unisexual or what sex ratios exist.

ANCASH. Huaráz: Carpa, 4100–4300 m, Bernardi et al. 16591 (US). **Recuay:** Huascarán National Park, moraine below Nevado Pasto Ruri, 4700 m, Smith 11431 (F, MO). **JUNÍN. Junín:** ca. 9 km N of Junín on road to Cerro de Pasco, 4160 m, Dillon 2517 (F, HUT, MO, US, USM); Mount La Juntay, near Huancayo, ca. 4700 m, Killip & Smith 22105 (US).

VII. *Facelis*

Facelis Cass., *Bull. Soc. Philom. Paris* 1819: 94.

1819. TYPE: *Gnaphalium retusum* Lam. = *Facelis retusa* (Lam.) Schultz-Bip.

Annual herbs; stems simple or branched, erect to decumbent. Leaves alternate, the margins en-

tire. **Capitulescences** of solitary heads, axillary or terminal, occasionally glomerulate in axils of the upper leaves. **Capitula** disciform; involucres cylindrical to ovoid or campanulate; phyllaries 3–5-seriate, imbricate, the outer foliaceous, the inner membranous, hyaline; receptacle plane, naked; pistillate florets 1–2-seriate, the corollas filiform; disc florets hermaphroditic, the corollas narrowly tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the style branches linear, apex acute, dorsal surfaces pubescent. **Achenes** turbinate, densely sericeo-velutinous; pappus bristles plumose, uniserrate, the bases fused, deciduous together as a unit.

Key to Species of *Facelis*

1. Herbs with stems generally simple, erect, 5–35 cm high; leaves 15–25 mm long; capitula 5–7 mm high, 2–3 mm wide *F. lasiocarpa*
1. Herbs with stems generally much-branched from the base, ascending or decumbent, 2–7 cm high; leaves 5–10 mm long; capitula 4–5 mm high, ca. 1.5 mm wide *F. plumosa*

1. **Facelis lasiocarpa** (Griseb.) Cabr., Physis 10: 280. 1931. **Figure 9.**

Filago lasiocarpa Griseb., Abh. Königl. Ges. Wiss. Göttingen, 19: 180. 1874. TYPE: Argentina, Prov. Tucumán, Ciénaga, Sierra de Tucumán, 13/31 Mar 1872, P. G. Lorentz 123 (holotype, GOET, not seen; isotype, CORD, not seen).

Facelis schultziana Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 219. 1913. TYPE: Bolivia, Dept. La Paz, Prov. Larecaja, "viciniis Sorata, clivosis collis Cataguata, in dumosis, 2700 m," G. Mandon 177 (holotype, G-BOIS, not seen).

Annual herbs, 5–35 cm tall; stems simple or sometimes branched from the base, slender, lanate, foliaceous to the apex. Leaves sessile; blade narrowly linear, 15–25 cm long, ca. 1 mm wide, apex attenuate, mucronate, lower surface densely lanate, upper surface laxly lanate, the margins revolute. Capitulescences glomerulate or of solitary heads in the axils of the upper leaves, sessile. **Capitula** 5–7 mm high, 2–3 mm wide; involucres ovoid; phyllaries 3–4-seriate, the outer lance-ovate to lanceolate, 2.5–4 mm long, 0.5–1.5 mm wide, foliaceous, lanate, apex acute, mucronate, the inner ovate to oblong, 5–6 mm long, 0.8–1 mm wide, scarious, apex obtuse to rounded, glabrous; pistillate florets 4–8, the corollas ca. 2.5 mm long; hermaphroditic florets 2–5, the corollas ca. 3 mm long. Achenes 1–1.5 mm long; pappus bristles 5–6 mm long.

Facelis consists of four species distributed throughout South America. This genus is readily distinguished by its densely sericeo-pubescent achenes and pappus of plumose bristles, both characteristics not found elsewhere in the Peruvian Inuleae. Two species are known from Peru.

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CABRERA, A. 1978. Compositae. Flora de la Provincia de Jujuy. Colecc. Cient., Inst. Natl. Tecn. Agropec., 13: 259–260.

Facelis lasiocarpa is distributed throughout the Andean Cordillera from Ecuador to northern Argentina, 1800–3800 m. It is very similar to *F. plumosa*, differing only in its non-branching habit and larger capitula and with a greater number of pistillate florets. Further study may show it to be conspecific with *F. plumosa*.

ANCASH. Bolognesi: Cerros al E de Chiquián, 3500–3600 m, *Cerrate* 542 (F, MO, USM). **CAJAMARCA. Contumazá:** Ventarrón (Trinidad-Totorillas, 3000 m, *Sagástegui et al.* 8988 (F, HUT, MO); Las Campanillas (Guzmango), 2700 m, *Sagástegui & Mostacero* 9159 (F, HUT, MO); El Mojón (Las Quinuas-Huatum), 3000 m, *Sagástegui et al.* 10125 (F, HUT, MO); Yetón-Guzmango, 1800 m, *Sagástegui et al.* 10326 (F, HUT, MO), *Sagástegui et al.* 10559 (F, HUT). **LA LIBERTAD. Otuzco:** desvío a Otuzco-Agallpampa, 2800 m, *Sagástegui et al.* 11534 (F, HUT, MO). **LIMA. Huarochiri:** Matucana, ca. 8000 ft, *Macbride & Featherstone* 446 (F, US).

2. **Facelis plumosa** (Wedd.) Schultz-Bip., Linnaea 34: 532. 1866. **Figure 9.**

Lucilia plumosa Wedd., Chlor. And. 1: 155. 1856. TYPE: Peru, "Cordilleres du Perou, entre Puno et Arequipa, 4000 m," H. A. Weddell s.n. (holotype, P, not seen, F neg. 37819).

Facelis weddelliana Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 217. 1913. (*nomen novum* based upon *Lucilia plumosa* Wedd.).

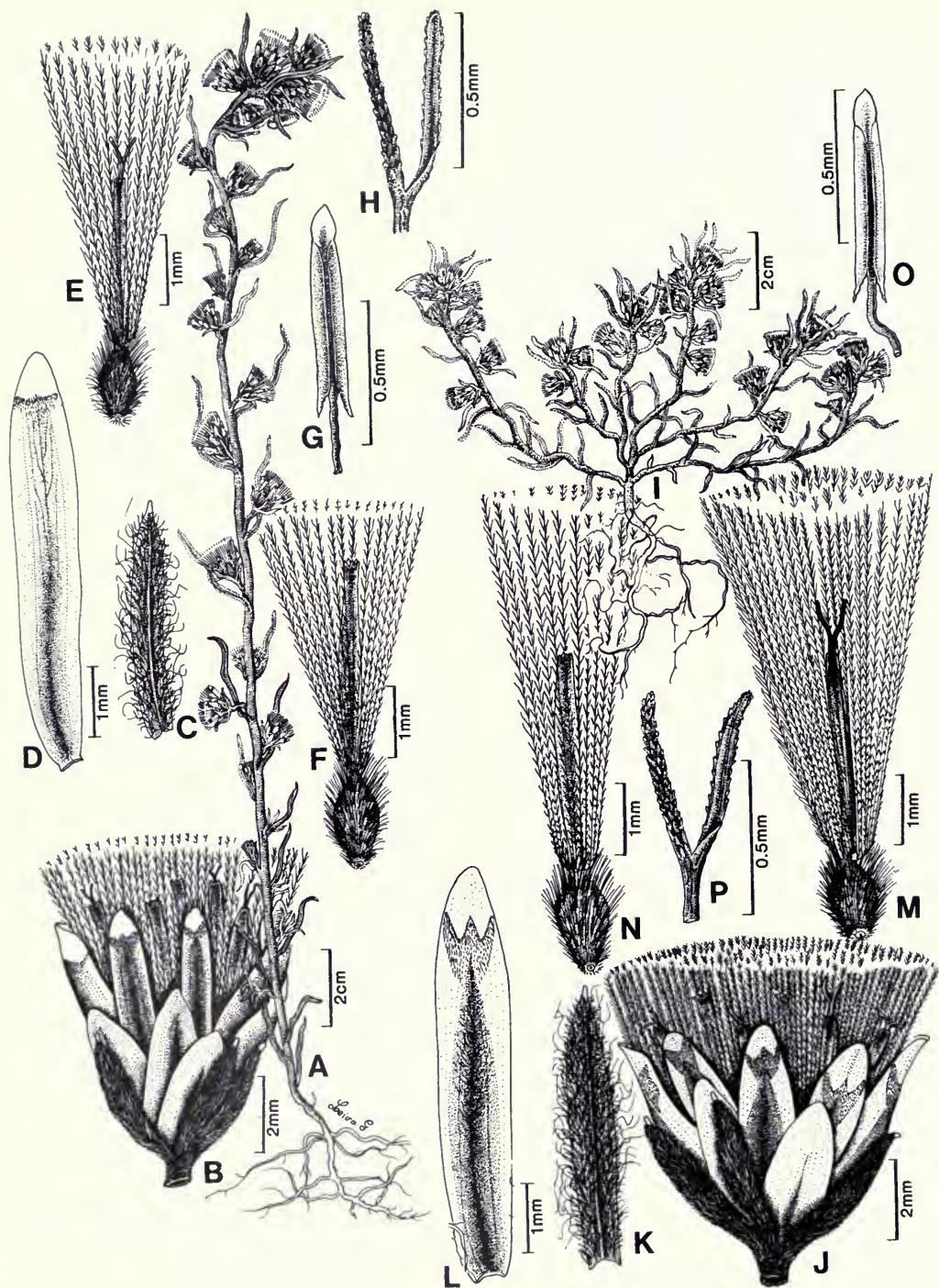


FIG. 9. Left side: *Facelis lasiocarpa*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, stamen; H, style branches of hermaphroditic florets. (Drawn from Sagástegui 3802, HUT.) Right side: *Facelis plumosa*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, stamen; H, style branches of hermaphroditic florets. (Drawn from Sagástegui 4508, HUT.)

Annual herbs, 2–7 cm tall; stems usually branched from the base, slender, lanate, foliaceous to the apex. **Leaves** sessile; blade narrowly linear, 5–10 mm long, ca. 1 mm wide, apex attenuate, mucronate, lower surface densely lanate, upper surface laxly lanate, the margins revolute. **Capitulescences** of 1–3 heads glomerulate in the axils of the upper leaves, sessile. **Capitula** 4–5 mm high, ca. 1.5 mm wide; involucres ovoid-cylindrical; phyllaries 3–4-seriate, the outer lanceolate to linear, 2.5–3 mm long, 0.5–1 mm wide, foliaceous, lanate, apex acute, mucronate, the inner ovate to oblong, 4–5 mm long, 0.5–1 mm wide, scarious, apex obtuse to rounded, glabrous; pistillate florets 3–6, the corollas ca. 2.5 mm long; hermaphroditic florets 2–4, the corollas ca. 2.5 mm long. **Achenes** 1–1.5 mm long; pappus bristles 3–4 mm long.

Facelis plumosa is distributed from central Peru to northern Argentina, 2800–4300 m. It is similar to *F. lasiocarpa* but is distinguished from the latter by its more branched habit and smaller capitula with fewer pistillate florets.

AREQUIPA. Arequipa: above Arequipa, 2800 m, Pennell 13251 (F, GH, US); Pampa de Arrieros, 3750 m, Pennell 13326 (F). **AYACUCHO.** Huanta: Pampalca, between Huanta and Río Apurímac, ca. 3200 m, Killip & Smith 23291 (us). **LIMA.** Lima: Río Blanco, 12,000 ft, Macbride & Featherstone 738 (F, US). **JUNÍN.** Yauli: Yauli, ca. 13,500 ft, Macbride & Featherstone 915 (F). **PUNO.** Melgar: Araranca, 4100–4300 m, Pennell 13459 (F, GH, US).

slender; hermaphroditic florets 1–5, the corollas tubular, yellowish, 5-lobed, the anthers tailed, the terminal appendages obtuse, the style branches truncate, penicillate. **Achenes** obovoid to ellipsoid, surface with sinuate-reticulate sculpturing, glandular with bicelled, sessile papillae or trichomes, mucilaginous when wet, stramineous to brown; pappus bristles scabrid, barbellate, uniseriate, the bases fused into a ring, lacking basal cilia, deciduous together as a unit, white. Chromosome number: $n = 14$.

Gamochaeta is a genus of some 80 species distributed primarily in the warmer regions of the New World, but with several species adventive in the Old World. The taxonomy of *Gamochaeta* and its close relatives is extremely difficult because easily observable or quantifiable characters are lacking. *Gamochaeta* is here accepted on the strength of the suite of characteristics that allows for the recognition of its constituent elements: obovate to spatulate leaf form, usually spiciform capitulence, involucre cylindrical to conical, number and ratio of masculine to feminine florets per capitulum, pappus bristles fused at the base, and achenal surface sculpturing and pubescence.

The discrimination of species within *Gamochaeta* poses additional problems. Many species exhibit considerable morphological plasticity, presumably in response to environmental and edaphic influences. This treatment should be considered provisional; extensive biosystematic study is beyond the scope of the present work.

VIII. Gamochaeta

Gamochaeta Wedd., Chlor. And. 1: 151. 1856.
TYPE: *Gnaphalium americanum* Miller ≡
Gamochaeta americana (Miller) Wedd.

Gnaphalium section *Gamochaeta* (Wedd.) O. Hoffm.

Annual or perennial **herbs**, usually tomentose or lanate. **Leaves** alternate, simple, often with a basal rosette; blade oblanceolate to spatulate, the margins entire or crenulate, lanate or tomentose, occasionally discolorous. **Capitulescences** glomerulate, spiciform, or paniculate. **Capitula** disciform, heterogamous; involucres cylindrical to conical, rarely campanulate; phyllaries 3–4-seriate, imbricate, scarious, stramineous to dark brown or occasionally reddish, the margins usually hyaline; receptacles flat, glabrous; pistillate florets 35–100, the corollas filiform, 5-dentate, the style branches

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Key to Species of *Gamochaeta*

1. Leaf surfaces discolorous, lower surfaces white or silvery tomentose, upper surfaces glabrescent, gray or green *G. americana*
1. Leaf surfaces ± similar in color and pubescence, lower and upper surfaces tomentose or lanuginose 2
 2. Erect annual or biennial herbs, stems never cespitose, generally greater than 12 cm tall *G. purpurea*
 2. Cespitose perennial herbs, generally less than 12 cm tall 3
 3. Leaves generally obovate, 4–22 mm long, 1.5–4 mm wide; capitula ca. 4.5 mm high, ca. 4 mm wide *G. humilis*
 3. Leaves generally oblanceolate, 10–40 mm long, 4–7 mm wide; capitula ca. 4 mm high, ca. 2.5 mm wide *G. oreophila*

1. *Gamochaeta americana* (Miller) Wedd., Chlor. And. 1: 151. 1856.

Gnaphalium americanum Miller, Gard. Dict., ed. 8. 1768. TYPE: Jamaica, 1731, *W. Houston s.n.* (holotype, BM, not seen).

Gamochaeta spicata (Lam.) Cabr., Bol. Soc. Argent. Bot. 9: 380. 1961.

Gnaphalium spicatum Lam., Encycl. 2: 757. 1788.

TYPE: Uruguay, Montevideo, (? “Des environs de Buenos Ayres”) P. Commerson *s.n.* (lectotype, P, designated by Cabrera (1961), not seen, F neg. 37573, fragment, F). Non Miller (1768).

Annual or biennial herbs to 60 cm tall; stems branched, decumbent or erect. Basal leaves rosulate, sessile; blade linear- to oblong-spatulate, 3–10 cm long, 8–20 mm wide, marcescent, base truncate and clasping the stem, apex obtuse to rounded, rarely acute, apiculate, strongly discolorous, lower surface tomentose, upper surface glabrescent or more commonly glabrous and bright green, the margins entire, sometimes undulate distally; caudine leaves linear, apex acute, gradually smaller upwards, pubescence similar to basal leaves. Capitulescences spiciform, terminal and axillary. Capitula 4–4.5 mm high, 2.5–3 mm wide; phyllaries ca. 24, 3–4-seriate, the outer ovate, 2–3 mm long, 1–1.2 mm wide, apex obtuse to acute, the inner linear-oblong, 3.5–4 mm long, 0.8–1 mm wide, glabrous, apex acuminate, apiculate; pistillate florets ca. 80, the corollas ca. 2 mm long; hermaphroditic florets 3–4, the corollas ca. 2.2 mm long. Achenes

NESOM, G. 1990. The taxonomic status of *Gamochaeta* (Asteraceae: Inuleae) and the species of the United States. In press.

TURNER, B. L., A. M. POWELL, AND J. CUATRECASAS. 1967. Chromosome numbers in Compositae. XI. Peruvian species. Ann. Missouri Bot. Gard., 54: 172–177.

0.5–0.6 mm long; pappus bristles ca. 2.5 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984; Turner et al., 1967, as *G. spicata*).

Gamochaeta americana is distributed throughout Central and South America and is adventive in the United States and New Zealand. In Peru, it is distributed in a wide range of habits and is quite variable in overall size. Its common names include *lengua de perro*.

There has been considerable disagreement as to the specific boundaries of *Gamochaeta americana*. Adams (*Flowering Plants of Jamaica*, 1972), and followed by D’Arcy (*Flora of Panama*, 1975), placed *G. spicata* into synonymy under *G. americana*. Cabrera (1961), Godfrey (1958), and Drury (1971) all maintained *G. americana* and *G. spicata* and distinguished them by differences in the upper leaf pubescence and phyllary shape. Both Hillard and Burtt (1981b) and Nesom (1990) have pointed out that Lamark’s *Gnaphalium spicatum* is illegitimate as a later homonym of Miller’s species which possibly represents *Pterocaulon virgatum* (L.) DC. We have adopted a broad concept for *G. americana* and inculde taxa with acute to obtuse phyllaries and glabrous to glabrescent upper leaf surfaces.

AMAZONAS. Bagua: 48 km NW of Chachapoyas on road to Bagua, 1280 m, Gentry et al. 23210 (F, MO, USM). Mendoza de Rodríguez: Mendoza, 1700 m, Woytkowski 8086 (MO). ANCASH. Yungay: Quebrada de Llanganuco, 3900 m, López et al. 8347 (HUT, MO); Huascarán National Park, Llanganuco sector, 3580–3850 m, Smith

& Goodwin 8838 (F). **APURIMAC.** Abancay: Sayhuite, Km 45 E of Abancay, 3600 m, Hutchison 1736 (F, NY US). **CAJAMARCA.** Cajamarca: ca. 43 km E of Cajamarca, 27 km N of San Marcos, 2765 m, Dillon et al. 2861 (CPUN, F, HUT, MO, NY, TEX, US, USM). Celendín: Pumarrume, 2800 m, Mostacero et al. 0999 (F, HUT). **CUZCO.** Paucartambo: Km 141 of Kosñipata road, 16 km below Pillahuata, 2050 m, Stein 2525 (F, MO, USM). **HUANCAVELICA.** Huancavelica: entre Huancavelica y Lachoj, 3800 m, Tovar 3080 (USM). **HUÁNUCO.** Huánuco: between Huánuco and Tingo María, ca. Km 443.5, 2010 m, Croat 57825 (MO); ca. 47 km NNE of Huánuco on road to Tingo María, Carpish Pass, Dillon 2599 (F); Carpish, entre Huánuco y Tingo María, 2700–2900 m, Ferreyra 2344 (USM). **JUNÍN.** Tarma: 28–32 km NE of Tarma on road to San Ramón, ca. 2480 m, Dillon & Turner 1350 (F, MO, USM); ca. 35 km NE of Tarma along road to San Ramón, ca. 2300 m, Dillon & Turner 1407 (F, MO, USM); Huacapistana, entre Tarma y San Ramón, 1800–1900 m, Ferreyra 287a (USM). **Prov. Unknown:** Yaupi, 1580 m, Woytkowski 6426 (MO), 6428 (MO). **LA LIBERTAD.** Otuzco: Chota (Yamobamba-Shorey), 2900 m, Sagástegui et al. 11081 (F, HUT). Sánchez Carrón: Laguna Sausacocha, 3000 m, Sagástegui 9444 (F, HUT, MO). **LAMBAYEQUE.** Lambayeque: Km 28 W of Olmos, 1150–1200 m, Hutchison & Wright 3474 (F, MO, US). **LIMA.** Canta: Canta, 2942 m, López 3297 (US). **MOQUEGUA.** Mariscal Nieto: between Torata and Carumas, km 75–76 from Moquegua to Puno, 3600 m, Dillon et al. 3357 (F). **PASCO.** Oxapampa: Oxapampa, Esposto s.n. (USM #19319). **PIURA.** Huancabamba: Cuello del Indio (ruta Huancabamba), 2800 m, López et al. 8889 (F, HUT, MO). **PUNO.** Carabaya: across Río San Gabán from Ollachea, Boeke & Boeke 3053 (US). **SAN MARTÍN.** Lamas: Alonso de Alvarado, Cerro Blanco (carretera a Moyobamba), 1000 m, Schunke 6192 (NY, US); San Roque, 1350–1500 m, Williams 7445 (F, GH p.p., US).

2. **Gamochaeta humilis** Wedd., Chlor. And. 1: 153. 1856. TYPE: Bolivia, Dept. La Paz, Chiquianguillo, 4500 m, H. A. Weddell s.n. (holotype, P, not seen, F neg. 37600).

Perennial herbs to 12 cm tall; stems branched, cespitose to decumbent or erect. Basal leaves rosulate, sessile; blade obovate to oblanceolate or spatulate, 4–22 mm long, 1.5–4 mm wide, marcescent, base attenuate to a pseudopetiole, apex obtuse to rounded, rarely acute, slightly discolorous, lower surface canescent-tomentose, upper surface incano-lanate, the margins entire; caudine leaves oblanceolate to spatulate, often subfalcate, 5–20 mm long, 2–5 mm wide, base attenuate, apex acute, pubescence similar to basal leaves. Capitulescences laxly spiciform or terminally glomerulate. Capitula ca. 4.5 mm high, ca. 4 mm wide; involucres campanulate; phyllaries ca. 24, 4-seariate, stramineous, the outer ovate, 1.5–2.2 mm long, 0.5–1 mm wide, dorsally lanate, apex acu-

minate, the inner oblong-linear, 2.8–3 mm long, 0.4–0.8 mm wide, lanate to glabrous, apex acute; pistillate florets 35–40, the corollas ca. 2 mm long; hermaphroditic florets ca. 3, the corollas ca. 2 mm long. Achenes 0.5–0.7 mm long, sparsely glandular to glabrous; pappus bristles ca. 2 mm long.

Gamochaeta humilis is distributed from the Department of Ancash in central Peru to northern Bolivia. In Peru, it occurs in open areas of *puna* vegetation, 3560–4600 m.

This species is characterized by its short, cespitose habit (usually less than 12 cm tall), mostly falcate leaves, and more glomerulate capitulescences. In general habit, *Gamochaeta humilis* approaches the form of various *Belloa* species, but *G. humilis* may be distinguished by the truncate style branches of the hermaphroditic florets. *Gamochaeta humilis* appears most closely related to *G. oreophila*, which occurs in central and northern Peru, and it appears that the distributional ranges of the two overlap to some degree in Ancash and La Libertad. Further sampling is necessary to determined if these two species occur sympatrically or occupy different microhabitats.

ANCASH. Huaráz: Huascarán National Park, Quebrada Llaca, 4400–4600 m, Smith et al. 10807 (F). **AYACUCHO.** Huanta: between Huanta and Hacienda Pargora, 4150 m, Killip & Smith 22192 (F, NY). **CUZCO.** Quispicanchis: Auzangate, 4600 m, Rauh & Hirsch P1244 (NY). Paucartambo: Tres Cruces, 1–13 km NW of Paucartambo-Pilcopata road, 3330–3500 m, Gentry et al. 23470 (F p.p., MO, USM); paso de Tres Cruces, Cerro de Cusilluyoc, 3800–3900 m, Pennell 13869 (F p.p., NY p.p.). Paruro: Cerro Sullcan, Hda. Ayusbamba, 4020 m, Vargas 845 (F). Urubamba: Pampacahuana, 4100 m, Peyton & Peyton 77 (MO). **JUNÍN.** Tarma: Oroya-Tarma, 4200 m, Rauh & Hirsch P269 (NY). Yauli: Yauli, ca. 13,500 ft, Macbride & Featherstone 930 (F). **LA LIBERTAD.** Santiago de Chuco: Jalca de Coipín, 4000 m, Sagástegui et al. 11982 (F, HUT). **MOQUEGUA.** Mariscal Nieto: between Torata and Carumas, Km 75–76 from Moquegua to Puno, ca. 3600 m, Dillon et al. 3356 (F). **PUNO.** Azángaro: Arapa, 3900 m, Aguilar s.n. (USM p.p.). Carabaya: Macusani-Condorquina, 4400 m, Vargas 17630 (US). **HUANCANE.** Majachi, 3950 m, Aguilar s.n. (F, USM); Moho, 3950 m, Aguilar 414 (USM). Melgar: La Raya-Sicuani, 4300 m, Rauh & Hirsch P678 (NY). **Prov. Unknown:** Lago Titicaca, 4000 m, Monheim M102 (NY).

3. **Gamochaeta oreophila** Dillon & Sagást., nomen novum. Figure 10.

Gamochaeta monticola Dillon & Sagást., Phytologia 59: 227. 1986. TYPE: Peru, Dept. La Libertad, Prov. Santiago de Chuco, entre Chota y Shorey,

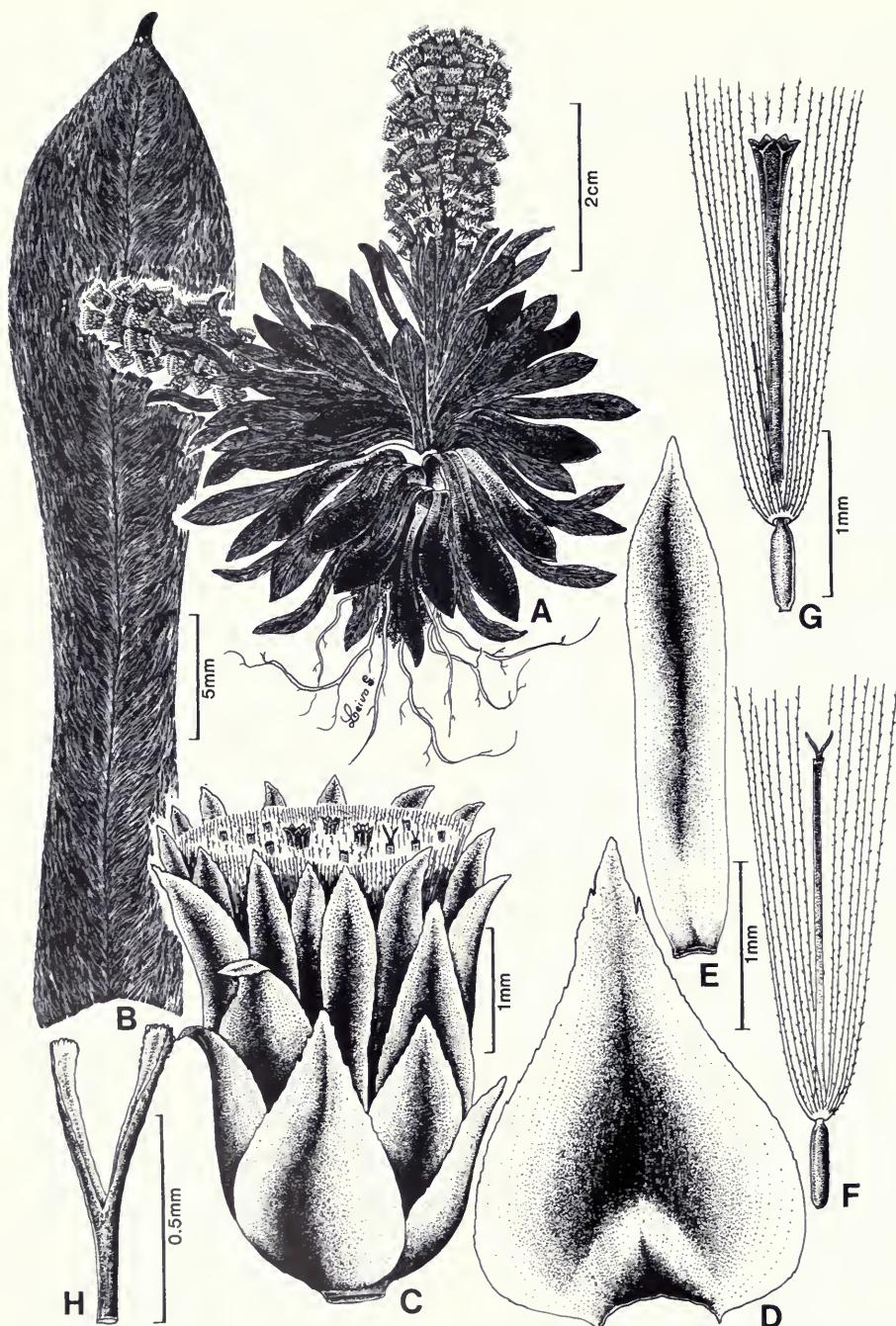


FIG. 10. *Gamochaeta oreophila*. A, habit; B, leaf (underside); C, capitulum, D, outer phyllary; E, inner phyllary; F, pistillate floret; G, hermpahroditic floret; H, style branches of hermpahroditic floret. (Drawn from Sagástegui et al. 11100, HUT.)

ladera, 3250 m, 15 Nov 1983, A. Sagástegui A. et al. 11100 (holotype, HUT; isotypes, F, MO). A new specific epithet is required because of the discovery of the earlier homonym *Gamochaeta*

monticola (Phil.) Cabrera, Bol. Soc. Argent. Bot. 9: 374. 1961.

Cespitose, perennial herbs; stems simple or

branched, 1–6 cm tall. Basal leaves densely rosulate, sessile; blade oblanceolate, 1–4 cm long, 4–7 mm wide, base attenuate to a winged petiole, apex acute to rounded, mucronate, discolorous, lower surface tomentose, upper surface lanate, the margins entire, the caudine leaves gradually smaller. Capitulescences spiciform. Capitula 3.5–4 mm high, 2–2.5 mm wide; involucres campanulate; phyllaries ca. 22, 3–4-seriate, stramineous, the outer ovate, ca. 2.2 mm long, ca. 1.2 mm wide, dorsally lanate, apex acuminate, the inner oblong-linear, 2.9–3.2 mm long, 0.4–0.7 mm wide, glabrous, apex acute; pistillate florets 42–45, the corollas ca. 2 mm long; hermaphroditic florets 2–3, the corollas ca. 2 mm long. Achenes 0.5–0.7 mm long; pappus bristles ca. 2.5 mm long.

Gamochaeta oreophila is infrequent in open areas within *jalca* formations of northern and central Peru (Departments of Ancash, Cajamarca, and La Libertad, 3100–4870 m). It is a distinctive member of the genus, possessing densely rosulate, canescent, basal leaves and erect, compressed spiciform capitulescences. It most closely resembles *G. humilis* of central and southern Peru and northern Bolivia; however, the latter species normally has a more branched, decumbent habit, smaller spatulate and falcate leaves, and an open capitulence.

ANCASH. Carhuáz: Huascarán National Park, Quebrada Ishinca, 4380–4500 m, Smith et al. 9486 (F, MO, USM). **Huaráz:** Huascarán National Park, Quebrada Shallap, 3690–4100 m, Smith et al. 9650 (F, MO). **Huaylas:** Huascarán National Park, Quebrada Alpamayo, 4350–4500 m, Smith et al. 9801 (USM), 9849 (F). **Yungay:** Huascarán National Park, Quebrada Ancosh, Smith & Goodwin 8886 (MO, USM). **CAJAMARCA. Celendín:** ca. 57 km NE of Cajamarca along road to Celendín, ca. 3650 m, Dillon & Turner 1614 (F); Sendamal, 3100 m, Sagástegui et al. 12228 (F, HUT, K, MO). **San Miguel:** Taulís Alto (jalca), ladera, 3100 m, Sagástegui et al. 9548 (F, HUT, MO). **LA LIBERTAD. Otuzco:** Motil-Shorey, 3500 m, Sagástegui & Fernández 4914 (HUT, US), Sagástegui et al. 11698 (F, HUT, MO); Cerro Ragache, Salpo, 3500 m, Sagástegui et al. 11627 (HUT, MO). **LAMBAYEQUE. Ferreñafe:** ca. 7 km NW of Incahuasi, near Cerro Punamachay on trail to Laguna Hualtaco, 3300–3550 m, Dillon & Skillman 4128 (F), Sagástegui et al. 12842 (F, HUT, MO), Sagástegui et al. 12865 (F, HUT), Sagástegui et al. 12914 (F, HUT, MO, K).

4. *Gamochaeta purpurea* (L.) Cabr., Bol. Soc. Argent. Bot. 9: 377. 1961.

Gnaphalium purpureum L., Sp. Pl. 2: 854. 1753. TYPE: United States, "habitat in Carolina, Virginia,"

Pennsylvania [Pennsylvania]," P. Kalm s.n. (holotype, LINN, not seen, IDC Microfiche 117. 572. III: 2.).

Annual or biennial herbs to 40 cm tall; stems branched, decumbent or erect. Basal leaves rosulate, sessile; blade spatulate to oblanceolate, 1.5–3 cm long, 5–15 mm wide, marcescent, base truncate and clasping the stem, apex obtuse to rounded, rarely acute, apiculate, discolorous, lower surface tomentose, upper surface glabrescent or more commonly glabrous and bright green, the margins entire, sometimes undulate distally; caudine leaves linear, apex acute, gradually smaller upwards, pubescence similar to basal leaves. Capitulescences spiciform, terminal. Capitula ca. 3.5 mm high, ca. 2.5 mm wide; phyllaries ca. 24, 3–4-seriate, stramineous, the outer ovate, 2–2.5 mm long, 1–1.5 mm wide, apex obtuse to acute, the inner linear-oblong, 3–3.5 mm long, 0.5–0.8 mm wide, glabrous, apex acute; pistillate florets 70–80, the corollas ca. 2.2 mm long; hermaphroditic florets 3–4, the corollas ca. 2 mm long. Achenes ca. 0.5 mm long; pappus bristles ca. 2 mm long. Chromosome number: $n = 14$.

Gamochaeta purpurea has a wide distribution, including North and South America and Europe, and is adventive in New Zealand. In Peru, it is a common, weedy species and occupies a wide range of habitats, from coastal *lomas* formations to high-elevation Andean sites, 5–4300 m.

Three collections from southern Peru (Vargas 844, 845, & 9812) possess more narrowly linear leaves with denser, lanate-tomentose pubescence and congested, glomerulate capitulescences. While these collections are quite distinct, we are hesitant to give them formal taxonomic status until this genus is better understood.

Common names include *gheto ghetto*, *lengua de perro*, *allucupa callun*, and *lling-llica del cerro*.

ANCASH. Bolognesi: cerca a Chiquián, 3240–3300 m, Cerrate 785 (MO, USM); Ferreyra 7586 (MO, USM). **Huari:** Huascarán National Park, Quebrada Pucaraju, 3900–4200 m, Smith et al. 12705 (USM); 14.8 km NE of Tunel Cahuish, 3000–4000 m, Stevens 21964 (MO). **Huaylas:** carretera a Laguna Parón, ca. 24 km de Caráz, 3100 m, López 1865 (US); Huascarán National Park, Quebrada Santa Cruz, 4300 m, Smith et al. 9321 (F, MO, USM). **APURIMAC. Abancay:** between Saywite and Chachora, 4000 m, Vargas 9812 (F). **AREQUIPA. Arequipa:** southern slopes of Chachani, N of Arequipa, Hinkley 6 (F); Nevado de Chachani, 4100–4200 m, Pennell 13290 (GH, NY); Tiabaya, 2100–2200 m, Pennell 13094 (F, NY). **Camaná:** Lomas de Camaná, ca. 32 km SE of Camaná, ca. 1000 m, Dillon & Dillon 3878 (F, HUT, K, MO, NY, USM);

Lomas de Camaná, 600 m, *Ferreyyra* 11688 (USM). **Islay:** Lomas de Mejia, ca. 8 km N of Mejia, 500–600 m, *Dillon & Dillon* 3725 (F, HUT, MO, NY, USM); Lomas de Mollendo, ca. 8 km NW of Islay, ca. 510 m, *Dillon & Dillon* 3941 (F, HUT, MO, NY, USM); bajando la Jolla a Matarani, 500 m, *Ferreyyra* 6381 (USM); Mollendo, *Hitchcock* 22411 (us); 7 km NE of Matarani, 450 m, *López* 046 (MO). **CAJAMARCA.** *Cajamarca:* ca. 24 km SW of Cajamarca on road to Cumbemayo, ca. 3600 m, *Dillon et al.* 2918 (F, USM) Namora, 2600 m, *Sagástegui* 7738 (HUT, MO); Santa Apolonia-Cumbe Mayo, 3000 m, *Sagástegui et al.* 11276 (F, HUT). *Celendin:* Pumarrume, 28850 m, *Mos-tacero et al.* 1002 (F, HUT). *Chota:* Laguna Yahuarcocha, arriba de Incahuasi, 3600 m, *Sagástegui* 12897 (F, HUT). *Contumazá:* Yetón, 2200 m, *Sagástegui et al.* 9742 (F, HUT, MO); *Sagástegui & López* 10551 (F, HUT, MO); El Granero, 2800 m, *Sagástegui & López* 10651 (F, HUT), 10652 (F, HUT). **CUZCO.** *Cuzco:* Kaira, 3200 m, *Vargas* 659 (F). *Paucartambo:* Tres Cruces, 3600 m, *Marín* 1245 (F); Acanacu, 3500 m, *West* 7040 (GH). *Paruro:* cerro Sullcan, Hda. Ayusbamba, 4020 m, *Vargas* 844 (F), 845 (MO). *Urubamba:* Ollantaytambo, 3000 m, *Cook & Gilbert* 707 (us); summit of Antakillqua, 4500 m, *Davis et al.* 1712 (F); Vilcanota Valley, 3000 m, *Herrera* 1068 (us). **HUANCAVELICA.** *Huancavelica:* Caniorconca, a 3 km SE de Conaica, 3560–3590 m, *Tovar* 96 (us). **HUÁNUCO.** *Huánuco:* Mito, 9000 ft, *Macbride & Featherstone* 1750 (F, us), 1814 (F, us); Huánuco, *Macbride & Featherstone* 2446 (F, us). **JUNÍN.** *Tarma:* Acobamba, *Isern* 2029 (F). *Yauli:* Oroya, *Kalenborn & Kalenborn* 65 (NY); near Atocsayeo, ca. 4200 m, *Pearsall* 1149 (F). **LA LIBERTAD.** *Otzuco:* Plazapampa, 1800 m, *Cevasco s.n.* (MO); Chota (Yamobamba-Shorey), 2900 m, *Sagástegui et al.* 11081 (F, HUT); Cerro Ragache (Salpo), 3200 m, *Sagástegui et al.* 11572 (F, HUT, MO). *Patáz:* Huancaspata-Tayabamba, 3800 m, *López & Sagástegui* 8260 (HUT, MO). *Santiago de Chuco:* Santiago de Chuco, 2800 m, *Sagástegui et al.* 11725 (F, HUT, MO). *Trujillo:* between Trujillo and Salaverry, 5 m, *Eyerdam* 9052 (GH); Cerro Cabezón, 600 m, *Sagástegui & López* 11328 (F, HUT); Cerro Campana, 500 m, *Sagástegui* 4041 (HUT, us), *Sagástegui & López* 10416 (F, HUT, K, MO); Barraza, 60 m, *Sagástegui* 7802 (F, HUT, MO, NY). **LAMBAYEQUE.** *Chiclayo:* Cerro Reque, 540 m, *Llatas* 358 (F, HUT). *Ferreñafe:* Laguna Tembladera, Distrito Incahuasi, 3150 m, *Sagástegui et al.* 12800 (F, HUT), 12822 (F, HUT). *Lambayeque:* Abra de Porculla, km 45 E of Olmos, 1920 m, *Plowman et al.* 14267 (F, HUT). **LIMA.** *Cañete:* Lomas de Quilmaná, entre Mala y Cañete, 300–480 m, *Ferreyyra* 4006 (us, USM); Lomas de Grandos, 12 km N of Huaral, 600 m, *Stork & Vargas* 9330 (GH); hills of Asia, 300 m, *Vargas* 9302 (GH). *Canta:* ca. 1.5 km NE of Canta, ca. 3000 m, *Dillon et al.* 3195 (F). *Chancay:* Lomas de Lachay, entre Chancay y Huacho, 560 m, *Cerrate* 3826 (USM); Lomas de Lachay, ca. 105 km N of Lima, 300–500 m, *Dillon et al.* 3618 (F, HUT, MO, USM); Lomas de Granados, cerca a Huaral, 250–300 m, *Ferreyyra* 19417 (us, USM). *Huarochirí:* Matucana, 8000 ft, *Macbride & Featherstone* 184 (F, us); Río Blanco, 12,000 ft, *Macbride & Featherstone* 739 (F, us). *Lima:* Lomas de Amancaes, 400 m, *Cerrate* 2081 (MO, USM); Lomas de Pachacamac, 360 m, *Cerrate* 3552 (F, USM); Lomas de Amancaes, 300–400 m, *Ferreyyra* 4042 (us, USM); Lomas de Lurín, 400–500 m, *Ferreyyra* 9546 (MO, USM). **MOQUEGUA.** *Mariscal Nieto:* Lomas de Ilo, ca. 20 km E of Ilo, ca. 620 m, *Dillon et al.* 3326 (F, HUT, K, MO, NY).

US, USM), *Dillon & Dillon* 3649 (F, MO, USM), *Ferreyyra* 12568 (MO, USM). **PIURA.** *Ayabaca:* Ayabaca, 2742 m, *Soukup* 4341 (us). **Huancabamba:** 40–43 km E of Olmos on road to Pucara, 1600–1850 m, *Gentry et al.* 22661 (F, HUT, MO, USM). **PUNO.** *Azángaro:* Tequena, 20 km N de Arapa, *Aguilar* 418 (USM p.p.). *Melgar:* Nañoa, 3900–4000 m, *Vargas* 16254 (us). *Puno:* Amantaní, 3900 m, *Aguilar* 439 (MO, USM); Puno, 3900 m, *Aguilar s.n.* (MO, USM); Lampa, 4000 m, *Rauh & Hirsch* P650 (NY). **TACNA.** *Tacna:* Lomas cerca al Morro Sama, 500–600 m, *Ferreyyra* 12551 (MO, USM).

IX. *Gnaphalium*

***Gnaphalium* L., Sp. Pl. 850. 1753. LECTOTYPE:**
G. uliginosum L., designated by *Hitchcock & Green* (1929).¹

Annual or perennial herbs, rarely suffrutescent, usually lanate or tomentose. Leaves alternate, simple, sessile or petiolate, at times decurrent upon the stem; blade lanate or tomentose, occasionally glandular-puberulent, the margins entire or crenulate. Capitulescences corymbose to paniculate or cymose, open or dense, terminal and axillary, rarely of solitary heads, bracteolate. Capitula disciform, heterogamous; involucres ovoid to campanulate; phyllaries 3–4-seriate, imbricate, scarious, white, stramineous, brown, or sometimes reddish, the margins usually hyaline; receptacles flat, glabrous or sometimes with rudimentary caducous paleae; pistillate florets, (25–)40–130, the corolla filiform, the base slightly expanded, apex contracted, minutely 3–4-lobed, the style branches slender; hermaphroditic florets functionally staminate, 5–10(–25), the corolla tubular, yellow, white, or purplish, 3–5-lobed, the lobes usually pubescent with multicellular, stalked, capitate-glandular trichomes, the anthers sagittate, caudate, the terminal appendages obtuse, the style branches truncate, penicillate, the nectary conspicuous. Achenes oblong, subterete, glabrous, or papillose, rarely sparsely pubescent with multicellular, biseriate trichomes; pappus of smooth to scabrid, barbellate bristles, unisexual, free, usually caducous, white. Chromosome numbers: $n = 7, 14, 21, 28$.

Gnaphalium contains over 150 species and has a cosmopolitan distribution, with centers of diversity in Africa, Mexico, and upland South

¹ For a discussion of the choice of lectotype, see Jeffrey (1979).

America. The genus is represented by seven species in Peru occurring in a wide variety of habitats.

The generic limits between *Gnaphalium* and its close relatives, *Achyrocline* and *Helichrysum*, are ill-defined and often arbitrary. *Gnaphalium* is here considered to include those species with campanulate involucres, truncate style branches (hermaphroditic florets), free pappus bristles, and a large ratio of pistillate (25–120) to hermaphroditic (5–25) florets.

Hilliard and Burtt (1981) have provided evidence to support the acceptance of the segregate genus *Pseudognaphalium* Kirpichnikov. This genus was based upon the Mexican species, *Gnaphalium oxyphyllum* DC., and they expanded it to include 40 to 50 taxa from Africa, Asia, and several from South America. Furthermore, they maintain that *Pseudognaphalium* has little affinity with *Gnaphalium* (*sensu stricto*) (Hilliard & Burtt, 1981, p. 202) and suggest greatest affinity with *Helichrysum*. Only one South American species, *Gnaphalium cheiranthifolium* Lam., has been transferred, and numerous other American species need to be reclassified and transferred to *Pseudognaphalium*. While we recognize this genus, it is beyond the scope of this study to provide the transfers necessary to accept the genus in practice.

Species boundaries in *Gnaphalium* are often ill defined. McVaugh (Flora Novo-Galicianae 12: 447. 1984) has discussed the problem of specific boundaries in *Gnaphalium* and his remarks are applicable to the genus in Peru:

Most of the species, even the ones that are pretty surely native plants with well-defined natural ranges, behave as weeds when their surroundings are disturbed. Under these circumstances they exhibit a great deal of vegetative variability, making identification

difficult without prolonged study. The treatment offered below is a provisional one, as the diagnostic characters employed are quite empirical, and the observed variation (e.g., in number of phyllaries, relative numbers of perfect and pistillate flowers, etc.) should be interpreted anew in the light of field study and experimentation.

With these words of caution, the treatment presented here should be regarded as provisional, for many taxonomic and nomenclature problems remain to be solved within South American *Gnaphalium*.

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Key to Species of *Gnaphalium*

- Plants prostrate, decumbent, or suberect, often cushion-shaped; stems usually less than 12 cm long 2
- Phyllaries milk-white, leaves subtending capitulescences linear-spatulate, apex rounded to obtuse *G. lacteum*
- Phyllaries yellowish or brown, never milk-white; leaves subtending capitulescences spatulate to linear-lanceolate, apex acute to obtuse or rounded 3
 - Perennials; leaves densely and compactly white-tomentose, linear to narrowly spatulate, the margins often revolute and the leaves appearing cylindrical or thickened *G. polium*
 - Annuals; leaves laxly arachnoid-lanate and gray-tomentose, lanceolate to spatulate, the margins not revolute, the leaves appearing plane *G. badium*
- Plants erect or rarely decumbent; stems usually 12 cm long or longer 4
- Stoloniferous, single-stemmed, rosulate herbs; phyllaries with white, petaloid lamina at apex *G. antennarioides*

4. Multistemmed herbs, rarely with persistent, rosulate basal leaves; phyllaries lacking petaloid lamina at apex 5
5. Plants annual; capitula 2.5–3 mm high; achenes minutely pubescent with multicellular, biseriate trichomes *G. luteo-album*
5. Plants perennial; capitula 4–7 mm high; achenes imbricate-papillose, but lacking multicellular trichomes 6
6. Plants robust often to 1 m tall or greater; caudine leaves lanceolate to elliptic, 3.5–7 cm long, 5–20 mm wide, strongly discolorous; capitula 5–7 mm high; inner phyllaries usually acute or apiculate at apex; achenes ca. 0.6 mm long, 5-ribbed *G. elegans*
6. Plants usually 0.5 m tall or shorter; caudine leaves linear to lanceolate, (1–)2–5(–7) cm long, 2–5 mm wide, not strongly discolorous; capitula ca. 4 mm high; inner phyllaries usually obtuse at apex; achenes ca. 0.5 mm long, not obviously ribbed *G. dombeyanum*

1. *Gnaphalium antennarioides* DC., Prodr. 6: 224. 1838.

Helichrysum gnaphalooides Kunth, Nov. Gen. Pl. (fol.) 4: 68. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "crescit prope pagum Ayavacae Peruvianorum," A. Humboldt & A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209, 97: I, 7, F neg. 37977). Non *H. gnaphalooides* Steud.

Antennaria monica Wedd., Chlor. And. 1: 150. 1856. TYPE: Based upon Kunth's *Helichrysum gnaphalooides*. Weddell also cited the following collections: Colombia, Dept. Tolima, Quebrada del Azufral, J. Goudot (P, not seen); Ecuador, Prov. Pichincha, Quito, A. Humboldt & A. Bonpland s.n. (P, not seen, F neg. 37700).

Rosulate herbs, (9–)12–30 cm tall, stoloniferous; stems erect, foliaceous, lanate. Basal leaves sessile; blade oblanceolate to spatulate, 2–5 cm long, 3–5 mm wide, densely lanate-tomentose; caudine leaves linear to narrowly spatulate, 1–4 cm long, 1.5–2.5 mm wide, sessile, discolorous, often falcate, densely lanate-tomentose. Capitulescences densely glomerulate, terminal, peduncles to 2 mm long, subtended by densely lanate-tomentose foliaceous bracts. Capitula 6–7 mm high, 3–4 mm wide; involucres narrowly campanulate; phyllaries ca. 3-seriate, the outer ovate to lanceolate, 3–3.5 mm long, 1–1.5 mm wide, the inner linear-lanceolate, 5.5–6 mm long, ca. 1 mm wide, all with apices prolonged into a petaloid lamina, white, rounded to acute; pistillate florets 50–75, the corollas 2.6–3 mm long, apex pink; hermaphroditic florets 7–15, the corollas 2.5–3.3 mm long, pink. Achenes 0.6–0.8 mm long; pappus bristles 3.5–4 mm long.

Gnaphalium antennarioides is a relatively uncommon species distributed from Colombia to Bolivia. In Peru, it is known from scattered collections in high-elevation sites from the Depart-

ments of Piura to Cuzco. It is characterized by its erect, white petaloid phyllaries, stoloniferous habit, and terminal congested capitulescences. It has been confused with *Antennaria linearifolia*, another species with white petaloid phyllaries, but *G. antennariooides* may be readily distinguished by its strictly heterogamous capitula.

Gnaphalium antennariooides appears most closely related to *G. paramorum* S. F. Blake, a species with a rosulate habit and white, petaloid phyllaries from Colombia and Venezuela.

AMAZONAS. Bagua: Cordillera Colán NE of La Peca, 10,800 ft, Barbour 3428 (F, MO). **CUZCO. Paucartambo:** Tres Cruces, upper edge of Parque Nacional de Manu, 1–13 km NW of Parcartambo-Pilcopata Road, 3330–3500 m, Gentry et al. 23439 (F, MO); Cerro de Cusilluyoc, 3800–3900 m, Pennell 13869 (F p.p., GH, NY p.p.); Corihuayachina, Callanga, 3800 m, Woytkowski 565 (MO, USM). **Urubamba:** Machu Picchu, on the Palcay side of the Salcantay-Palcay pass, 3500 m, Peyton & Peyton 711 (F, MO).

2. *Gnaphalium badium* Wedd., Chlor. And. 1: 145. 1856. TYPE: Bolivia, Dept. Carangas, A. C. V. d'Orbigny 1366 (lectotype, P, designated by Cabrera (1978), not seen, F neg. 37581; lectotype fragment, F).

Prostrate to decumbent, annual herbs; stems 5–15 cm long, much-branched. Leaves sessile; blade oblong-spatulate, 0.5–1.5 cm long, 3–5 mm wide, base attenuate, apex obtuse to rounded, both surfaces laxly arachnoid-lanate. Capitulescences corymbose or glomerulate with 2-many heads. Capitula 4–5 mm high, 4–5 mm wide, subtended by leaves; phyllaries ca. 3–5-seriate, the outer ovate, the inner oblong, apex brown; pistillate florets ca. 100, the corollas 2.5–2.9 mm long; hermaphroditic florets 12–25, the corollas 2.5–2.9 mm long.

Achenes ca. 0.5 mm long; pappus bristles ca. 3 mm long.

Gnaphalium badium is distributed from northern Argentina to central Peru (3200–4800 m). It is distinguished by its small, annual habit and spatulate leaves with lax, gray, arachnoid-lanate tomentum. Its capitulescences are often surrounded and obscured by the upper leaves. The majority of collections have been from moist areas near high-elevation lakes.

This species may be confused with *G. polium*, another high-elevation species with a reduced habit, but is distinguished from the latter by its annual habit and more arachnoid-tomentose leaves that engulf and obscure the capitulescences.

ANCASH. Carhuáz: Huascarán National Park, Quebrada Ishinca, 4250–4100 m, Smith et al. 9555 (F, MO). **AYACUCHO. No Exact Locality:** Valley Puquio, 4000 m, Rauh & Hirsch P452 (NY). **JUNÍN. Yauli:** near Atocsayco, ca. 4200 m, Pearsall 897 (F); Marcapomacocha, 4300 m, Velarde 6593a (us). **LIMA. Huarochirí:** Rio Blanco, Macbride & Featherstone 782, 3026 (F, us); Ticlio, 4700 m, Rauh & Hirsch P255 (NY). **PUNO. Huancañé:** Cerro Calvario, Conima, 3900 m, Aguilar s.n. (USM), 443 (MO). **Melgar:** Orurillo, Soukup 554 (F). **Puno:** Amantaní, 3900 m, Aguilar s.n. (USM).

3. ***Gnaphalium dombeyanum* DC., Prodr. 6: 225. 1838.** TYPE: Peru, Dombey 38 (holotype, G-DC, not seen, IDC Microfiche 800. 1066: II. 4, F neg. 8223; isotype, F).

Erect or ascending herbs to 50 cm tall; stems densely lanate. Lower cauline leaves sessile to sub-amplexicaul, not decurrent on stems; blade linear-oblong to spatulate, (1–)2–5(–7) cm long, 2–5 mm wide, apex obtuse, lower surfaces white-tomentose, upper surfaces glandular-puberulent, the margins entire, often undulate; upper cauline leaves gradually smaller, base auriculate, amplexicaul, apex long acuminate. Capitulescences corymbose in semiglobose clusters of 4–12 heads. Capitula ca. 4 mm high, ca. 4 mm wide; involucres ovoid; phyllaries pale yellow to brown, glabrous, the outer broadly ovate, 3–4 mm long, ca. 1.5 mm wide, apex acute, the inner oblong, 3.6–4 mm long, 1.5–1.6 mm wide, apex obtuse, rarely mucronate; receptacles ca. 2 mm wide; pistillate florets 40–120 (–130), the corollas 2–3 mm long, 3-lobed, often reddish, glandular; hermaphroditic florets (4)–7–15(–20), the corollas 2–3 mm long, 5-lobed. Achenes ca. 0.5 mm long; pappus bristles 2–2.5

mm long. Chromosome number: $n = 7$ (as *G. chieranthifolium*).

Gnaphalium dombeyanum is a ubiquitous member of the genus in Peru and found in a wide range of habitats at various elevations. The concept adopted here recognizes a “species complex” that includes several previously recognized species; however, the pattern of morphological variability exhibited by these Andean elements makes application of names difficult. Populations are often morphologically heterogeneous with individuals having quite different character combinations found within a particular geographic area or environment. Characters that tend to exhibit the greatest variability include overall size of individuals, size and shape of the leaves, the density of pubescence, degree of expansion of the capitulescences, and color of phyllaries. Until a detailed biosystematic study of the genus is undertaken, this broad species delineation must be applied.

Label data indicate that *Gnaphalium dombeyanum* is occasionally used in folk medicine. It has the following common names: *botón de oro*, *huirahuira*, *qheto qheto*, *vira-vira*, *wila wila*.

Gnaphalium dombeyanum Complex

Several species originally described from Peruvian material are here considered to belong to the *Gnaphalium dombeyanum* complex. Because these taxa, upon further study, may prove worthy of taxonomic recognition, they are not here placed into formal synonymy. Rather, their distribution and/or salient characters are discussed; their final disposition must await further study.

Gnaphalium peruvianum Sprengel, Syst. veg. 3: 473. 1826 and *G. dysodes* Sprengel, Syst. veg. 4: 776. 1827

These two species represent the oldest names for Peruvian material here placed under *G. dombeyanum*. Types of these species have not been located. *Gnaphalium dysodes* has occasionally been applied to Peruvian collections; no material annotated as *G. peruviana* was seen in this study.

Gnaphalium jelskii Hieron., Bot. Jahr. 36: 483. 1905. SYNTYPES: Peru, Dept. Cajamarca,

Cutervo, K. Jelski 707, 710, 711 (b, probably destroyed, not seen, syntype 707 = F neg. 15104).

This species appears to fall into the range of morphological variability of *G. dombeyanum*; however, no type material has been studied.

Gnaphalium helichrysoides Wedd., Chlor. And. 1:

146. 1856. SYNTYPES: Peru, Dept. Cuzco, Oct 1839–Feb 1840, C. Gay s.n. (P, not seen, F neg. 37598; fragment, F 971889; Bolivia, Prov. Caranges, A. C. V. d'Orbigny 1377 (P, not seen).

This species appears to differ from *G. dombeyanum* in possessing white phyllaries.

Gnaphalium melanosphaerooides Schultz-Bip. ex Wedd., Chlor. And. 1: 148. 1856. TYPE: Peru, Dept. Puno, Macusani, W. Lechler 1838 (holotype, P, not seen; isotype, w, not seen, F neg. 33150).

This species differs from *G. dombeyanum* in possessing dark brown phyllaries.

Gnaphalium nanum Kunth, Nov. Gen. Sp. (fol.) 4: 62. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "juxta pagum Ayavaca, alt. 1410 hex.," A. Humboldt & A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209. 97: I. 1, F neg. 15111; isotype, b, probably destroyed).

The type consists of a single small stem and quite possibly represents a depauperate specimen of *G. dombeyanum*.

Gnaphalium lanuginosum Kunth, Nov. Gen. Sp. (fol.) 4: 65. 1820. TYPE: Peru, Dept. Piura, Prov. Ayabaca, "juxta pagum Ayavaca, alt. 1410 hex.," A. Humboldt & A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209. 96: III. 7, F neg. 37602).

This species was collected at the same locality as *G. nanum* and consists of a single stem (33 cm

long) with past bloom heads. No material resembling the specimen in the type photograph has been encountered in this study.

Material here placed under *Gnaphalium dombeyanum* has been previously annotated under additional names, including *G. cheiranthifolium* Lam. and *G. graveolens* Kunth. A discussion of these two taxa is provided under Doubtful and Excluded Names.

AMAZONAS. Chachapoyas: ca. 43 km NE of Balsas ca. 2900 m, Dillon & Turner 1721 (F, USM); Chachapoyas 2700 m, Williams 7546 (F, US). ANCASH. Bolognesi abajo de Raquía, 1900 m, Sagástegui et al. 12296 (F, HUT, MO). Huaráz: 4 km N of Monterrey, ca. 8400 ft King & Collins 9021 (F, US); Cachabamba, 2870 m, Smith & Buddensiek 10934 (F). Huaylas: Parque Nacional Huascarán, 4000 m, Bernardi et al. 16492 (US); Laguna Llanganuco, 3500–3800 m, Gentry et al. 37405 (F, MO). Zardini 1540 (MO). APURÍMAC. Abancay: Sayhuite Km 45 E of Abancay, 3600 m, Hutchison 1738 (F, NY, US, USM); 6–7 km NNW of Abancay, ca. 3100 m, Iltis & Ugent 700 (MO, USM); Curahuasi, 2800 m, Vargas 126. (F). AREQUIPA. Arequipa: ca. 40 km NNE of Arequipa on road to Nevado Chachani, 3500–4000 m, Dillon et al. 3277 (F); near Arequipa, 8000 ft, Harrison s.n. (GH); southern slopes of Chachani, 2700 m, Hinkley & Hinkley 45 (GH, US); Nevado de Chachani, 4100–4200 m, Penne 13290 (F), 13294 (F, GH); Arequipa, campo de aviación 2700 m, Ponce 109 (USM); Km 18 on road between Arequipa and Yura, 3300 m, Solomon 2847 (MO); Chilena Valley, 7500 ft, Stafford 563 (F). Camaná: 14 km on road S of Chala, 350–400 m, Worth & Morrison 15688 (GH). Caravelí: Lomas of Atiquipa, 150–200 m, Dillon & Dillon 3790 (F, USM); Lomas de Pongo, cerca a Acarí, 700–800 m, Ferrerya 13426 (MO); Atico, 100 m, Tovar 266 (USM). Islay: Lomas of Mollendo, ca. 8 km NW of Islay ca. 510 m, Dillon & Dillon 3940 (F, USM); 10 km E of Islay, 300 m, Worth & Morrison 15722 (F, GH, MO). AYACUCHO. La Mar: 40–46 km NNE of Tambo, 2710–3050 m, Luteyn & Lebrón-Luteyn 6359 (NY, US). Lucanas: Aucará, Chincha 3665 (US); entre Nazca y Puquio 3200–3300 m, Ferrerya 5483 (MO); Marcahuasi, arriba de Puquio, 3400–3450 m, Ferrerya 7213 (MO, US). CAJAMARCA. Cajamarca: ca. 27 km NNW of Cajamarca on road to Hualgayoc, Pampa de Cerro Negro, 3600 m, Dillon & Molau 3017 (F); ca. 6.5 km SW of Cajamarca 2980 m, Dillon et al. 2901 (F, USM); ca. 22.5 km S of Cajamarca on road to Chilote, 2740 m, Dillon et al. 3036A (F). Celendín: 31 km NE of Cajamarca, 2950 m, Dillon & Turner 1588, 1589 (F); Jalca de Kumulca, 3350 m, Sagástegui et al. 12038 (F, HUT, MO); Usnío, 3120 m, Sánchez et al. 2776 (MO). Contumazá: La Herilla (Guzmango), 3050 m, Sagástegui et al. 6456 (MO), 9696 (F, MO); Guzmango, 2600 m, Sagástegui 7726 (MO). CUZCO. Paucartambo: Llulluchayoc, 3100–3700 m, Vargas 4327 (F). Quispicanchis: 95 km above Quincemil on the Río Marcapata, 3480 m, Madison 1031 (GH). Urubamba: Chincheros, quebrada above Pojoj waterfall, 3450–3550 m, Davis et al. 1474 (F, US); Chincheros, Taucca, 4050 m, Davis et al. 1575 (F); Chincheros, 3750 m, King et al. 120 (F, US); camino a Puyupatamarca, 3290 m, Drey-

fus 12831 (MO); Machupicchu, 2500–2600 m, *Iltis et al.* 1045 (US); Ollantaytambo, 3650 m, *Peyton & Peyton* 52 (F, MO p.p.); Machupicchu, 2675 m, *Peyton & Peyton* 201 (MO); Machupicchu, 2400 m, *Vargas* 819 (F). **HUANCABELICA.** **Huancavelica:** Orccon, arriba de Conaica, 3550–3580 m, *Tovar* 83 (US); Caniorccona, 3 km SE de Conaica, 3560–3590 m, *Tovar* 98 (US p.p.). **Tayacaja:** 3 km N of Salcabamba, 3500 m, *Stork & Horton* 10328 (F). **HUÁNUCO.** **Huánuco:** Carpish Pass, ca. 2750 m, *Allard* 20994 (F, US); Cerro Carpish, ca. 48.5 km N of Huánuco, 8600 ft, *Davidson & Jones* 9188 (US); Carpish, 2700–2900 m, *Ferreyra* 2343 (USM); Mitotambo, arriba de Mito, 3000–3100 m, *Ferreyra* 6678 (US, USM); Carpish, cumbre entre Huánuco y Tingo María, 2700–2900 m, *Ferreyra* 8154 (F, MO, US); Yanano, ca. 6000 ft, *Macbride* 4944 (F, GH, US); Yanahuanca, *Macbride & Featherstone* 1192 (F, US); Mito, ca. 9000 ft, *Macbride & Featherstone* 1531 (F, US), 1801 (F, GH, US); N of Carpish Pass, 48.6 km NE of Huánuco, 2490 m, *Plowman & Rury* 11133 (F, US); Acomayo, *Ridoutt* 11499 (MO); Tumanga, 2400 m, *Woytkowski* 7958 (MO); Pillao, 2700 m, *Woytkowski* 34149 (F). **JUNÍN.** **Concepción:** Chicchi, 3500–3700 m, *Ochoa* 1989 (US). **Huancayo:** San Jerónimo, 3340 m, *Proano* 13 (MO, USM); Huancayo, cerca del Cementerio, *Ridoutt* 10318 (MO p.p.); Huancayo, 3317 m, *Soukup* 2955 (F, GH); Huancayo, 3800 m, *Velarde* 2342 (US). **Tarma:** 28–32 km NE of Tarma, ca. 2480 m, *Dillon & Turner* 1348A (F, USM); ca. 35 km NE of Tarma along road to San Ramón, ca. 2300 m, *Dillon & Turner* 1408 (F, USM); Chuquishunca, 2 km arriba de Huacapistana, 2000–2400 m, *Ferreyra* 458 (MO, USM), 11242 (MO); Chanchamayo valley, 1000 m, *Schunke* 412 (F); Abobamba, 3500 m, *Woytkowski* 71 (F). **Yauli:** Oroya, *Kalenborn* 42 (GH, MO, US), *Kalenborn & Kalenborn* 83 (NY); La Oroya, ca. 12,000 ft, *Macbride & Featherstone* 979 (F, US); Baños, *Capt. Wilkes s.n.* (NY p.p.). **LA LIBERTAD.** **Huamachuco:** Rio Colorado, 3215 m, *La Rosa & Riccio* 3519, 3520 (US); Marca Huamachuco, 3300–3400 m, *La Rosa & Riccio* 3601 (US). **Otzoco:** Cerro Ragache (Salpo), 3200 m, *Sagástegui et al.* 11595 (F, HUT, MO); Shorey, Trujillo-Huamachuco, 3300 m, *Smith & Vasquez* 3271 (F, MO). **Sánchez Carrión:** Jalca de Quespuenda-Huamachuco, 3800 m, *Sagástegui* 9432 (F, HUT, MO). **LAMBAYEQUE.** **Chiclayo:** Cerro Reque, 540 m, *Llatas* 313 (F, HUT, MO). **LIMA.** Cañete, Lomas de Quilmana, entre Malá y Cañete, 250–320 m, *Ferreyra* 6317 (MO). **Canta:** La Florida, 2400–2500 m, *Ferreyra* 18423 (USM); Ijadero, Canta-Lachoque, 3700 m, *Meza* 108 (MO), 182 (USM); Llullum, 12 km arriba de Canta, 4100 m, *Meza* 210 (MO); near Antaicocha, Cerro Colorado, E of Canta, 3400–3800 m, *Pennell* 14631 (F); Huaros, 3400–3600 m, *Pennell* 14725 (F, GH, NY), 14726 (F); Purumarca, *Sánchez* 48 (USM). **Chancay:** Lomas de Lachay, entre Chancay y Huacho, 400–450 m, *Ferreyra* 8774 (MO); Chancay, *Ridoutt* 12208 (MO). **Huarochirí:** Surco, 3000–3200 m, *Ferreyra* 676 (USM); Chicla, 3700 m, *Ferreyra* 6518 (US, USM); Matucana, ca. 8000 ft, *Macbride & Featherstone* 298 (US), 360 (F, US p.p.); Rio Blanco, ca. 12,000 ft, *Macbride & Featherstone* 740 (F, US); Matucana-San Mateo, 3000 m, *Rauh & Hirsch* P76 (NY p.p.); Chicla, 3733 m, *Riccio* 3716 (US). **Yauyos:** Huacracoche, 17 km N de Tupe, 4400 m, *Cerrate* 1225 (USM); Cruzpampa, 2950 m, *Cerrate & Tovar* 1105 (F, MO, US). **MOQUEGUA.** **Mariscal Nieto:** Quebrada de Torata, *Núñez* 38 (USM). **PIURA.** **Huancabamba:** Hacienda Porculla, 1800–2000 m, *Ferreyra* 14175 (USM); Mitopampa,

Huancabamba-Cuello del Indio, 2650 m, *Sagástegui et al.* 8242 (MO, NY). **PUNO.** **Azángaro:** Amantaní, 3900 m, *Aguilar* 438 (MO); Isla Arapa, *Aguilar s.n.* (MO). **Huancañé:** Miajachi, Isla Chirone, s.d. (MO). **Melgar:** Orurillo, *Soukup* 503 (F, GH); Araranca, 4100–4300 m, *Pennell* 13472 (F, GH, NY, US, USM). **Prov. Unknown:** Tahuaco, 3850–3900 m, *Tovar* 5196 (USM).

4. *Gnaphalium elegans* Kunth, Nov. Gen. Sp. (fol.)
4: 63. 1820. **TYPE:** Ecuador, Prov. Pichincha, “prope Chillo et Cachambamba, 1340 hex, Jun” *A. Humboldt & A. Bonpland* 3001 (holotype, P, not seen, IDC Microfiche 6209. 96: III. I, F neg. 37591, fragment, F). **Figure 11.**

Gnaphalium poeppigianum DC., Prodr. 6: 227. 1838.
TYPE: Peru, Dept. Huánuco, Cuchero, 1829, *E. Poeppig* 1368 (holotype, G-DC, not seen; IDC Microfiche 800. 1067: I. 1.; isotypes, B, probably destroyed, F neg. 15138, F, GH, W, not seen, F neg. 33151).

Perennial herbs to 1 m tall; stems densely lanate or tomentose. Leaves sessile, the base subamplexicaul; blade lanceolate to elliptic, 3.5–7 cm long, 5–20 mm wide, apex acute to attenuate, discolorous, lower surface densely lanate, upper surface glandular-puberulent, the margins entire to crenulate. Capitulescences corymbose, terminal and axillary. Capitula 5–7 mm high, 3–5 mm wide; involucres ovoid to campanulate; phyllaries 3–4-seriate, white or straminous, the outer ovate, ca. 2.5 mm long, ca. 1.5 mm long, apex rounded to obtuse, the inner oblong to lanceolate, 4–7 mm long, apex acute to apiculate; receptacles 2–2.5 mm wide; pistillate florets 80–100, the corolla ca. 3 mm long, base slightly expanded, apex minutely 3–4-cleft; hermaphroditic florets 5–18, the corolla 2.5–3 mm long, yellowish, 3–5-lobed. Achenes ca. 0.6 mm long, 5-ribbed; pappus bristles 3–4 mm long. Chromosome number: $n = 14$ (Jansen et al., 1984).

Gnaphalium elegans is distributed from Mexico to Panama and throughout the Andes of northern South America from Venezuela to southern Peru (1400–3000 m). It is readily recognized by its robust habit, strongly discolorous cauline leaves, and large capitula with white or rarely stramineous phyllaries.

Several collections from central and northern Peru are tentatively placed under this species (*Ferreyra* 5730, p.p.; *Killip & Smith* 21844; *Sagástegui et al.* 11516; *Macbride & Featherstone* 271). Their leaves and bracts subtending the capitulescences



FIG. 11. *Gnaphalium elegans*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, achene. (Drawn from López et al. 9031, HUT.)

are more similar to material placed in *Gnaphalium dombeyanum*, but they have apiculate inner phyllaries and strongly 5-ribbed achenes of typical *G. elegans*. Further sampling in these regions may help to define the nature of this variation.

AMAZONAS. Chachapoyas: 2 kms along road W of Chachapoyas, ca. 7200 ft, King & Bishop 9177 (us). **AN-**
CASH. Bolognesi: Chiquián, 3500–3600 m, Ferrerya
5730 (us p.p.). **CAJAMARCA.** Cajamarca: ca. 22.5 km
S of Cajamarca on road to Chilete, 2740 m, Dillon et al.
3036 (f); Asunción-San Juan, 2500 m, Sagástegui et al.

10153 (F, HUT, MO). **Contumazá**: Tambo La Lima (Casas-Contumazá), 1650 m, López et al. 9031 (F, HUT, MO). **San Ignacio**: Maisgua (San Ignacio-Nueva Esperanza), López et al. 8996 (F, HUT, K, MO, NY). **CUZCO**. **Calca**: Lares-Manto, 2400 m, Marín 2289 (F). **La Convención**: Amayalamba, 1800 m, Marín 1514 (F, US). **Urubamba**: Río Urubamba, 2000 m, Angulo 1769 (HUT); Hacienda Santa Rita, Dreyfus s.n. (USM 12815); Machupicchu, 2400 m, Ferreyra 2731 (US, USM), Machupicchu, 2400 m, Vargas 811 (F). **HUÁNUCO**. **Huánuco**: Carpish, 2650 m, Asphund 13119 (US); between Huánuco and Tingo María, 6 km N of Acomayo, 2450 m, Croat 57870 (F, MO). **Pachitea**: Piedra Grande, estación near Río Santo Domingo, ca. 5000 ft, Macbride 3688 (F, US). **JUNÍN**. **Tarma**: Huacapistana, 1800–1900 m, Ferreyra 11306 (MO, USM); Tarma, 3000–3200 m, Killip & Smith 21844 (F, NY, US). **Prov. Unknown**: Agua Dulce, 1600 m, Woytkowski 7427 (GH, MO); Yucapata, 1400 m, Woytkowski 6622 (MO). **LA LIBERTAD**. **Otzaco**: Casmiche (Samnente-Otzaco), 1700 m, Sagástegui et al. 11516 (F, HUT, K, MO, NY). **LIMA**. **Huarochiri**: Matucana, 8000 ft (2424 m), Macbride & Featherstone 271 (F, US). **PIURA**. **Huanabamba**: Cerro Porculla, 3–11 km W of Continental Divide down W slope, Edwin & Schunke 3764 (COL, F, NY, US); 37 km E of Olmos on road to Pucara, 1500 m, Gentry et al. 22626 (F, MO). **PUNO**. **Puno**: region of Puno, Soukup 518 (F). **NO EXACT LOCALITY**. “Peruvia,” 1862, Matthews s.n. (NY p.p.).

5. Gnaphalium lacteum Meyen & Walpers, Nov.
Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19: 276. 1843. **TYPE**: Chile, Prov. Tarapacá, Tacora, F. J. F. Meyen s.n. (holotype, B, probably destroyed, F neg. 15105, fragment, GH).

Small, perennial herbs; stems prostrate, branched, densely white- to gray-tomentose, leafy to the apex, 5–10(–20) cm long. Leaves sessile; blade linear to spatulate, 3–15(–40) mm long, 2–3 mm wide, rarely decurrent, apex rounded, both surfaces densely white-tomentose, the margins entire. Capitulescences corymbose to corymbose-paniculate in semiglobose clusters of 3–8 capitula, terminal and axillary. **Capitula** 4–5 mm high, 3–4 mm wide; involucres campanulate; phyllaries white, the outer ovate, 2–3 mm long, 1.5–2 mm wide, apex obtuse to rounded, the inner oblong, ca. 4 mm long, 0.5–1.5 mm wide, apex rounded; receptacles ca. 2 mm wide; pistillate florets 75–100, the corollas 2.5–2.7 mm long; hermaphroditic florets ca. 12, the corollas ca. 3 mm long. Achenes ca. 0.6 mm long; pappus bristles ca. 3 mm long.

Gnaphalium lacteum is distributed from extreme northern Chile and adjacent Argentina and Bolivia to central Peru. It is distinguished by its small, predominately prostrate habit and pure

white phyllaries with obtuse to rounded apices. The overall size of individuals is variable, with some plants having quite long, multi-branched stems (e.g., Hinkley & Hinkley 3, GH). It superficially resembles other small prostrate species, e.g., *G. badium* and *G. polium*, and apparently occurs sympatrically with *G. polium* in one locality. A gathering by Pennell from Puno appears to be mixed; two duplicates of Pennell 13444 (GH, NY) are clearly *G. lacteum*, but the F sheet is clearly different, and here assigned to *G. polium*. Another collection from the same locality (Pennell 13470a, F) is also assigned to *G. polium* and indicates that these two species occur in the same geographic area.

Cabrera (1978) placed *Gnaphalium argyrolepis* Philippi under the synonymy of *G. lacteum*, and based on the type photograph and description, it appears that another species, *G. frigidum* Wedd., described from Tacora, Chile, may also be conspecific with *G. lacteum*.

ANCASH. **Bolognesi**: Chiquián, 4000 m, Ferreyra 5825 (US, USM). **AREQUIPA**. Arequipa: southern slopes of Chachani, north of Arequipa, 3600 m, Hinkley & Hinkley 3 (GH); above Arequipa, 3000–3300 m, Pennell 13219 (F, GH, NY); Volcán Chachani, 3700 m, Rauh & Hirsch P530 (NY). **HUANCAVELICA**. Castrovirreina: near Córdoba, 3050–3300 m, Metcalf 30266 (GH, F, MO). **LIMA**. **Canta**: carretera Canta-Lachaqui, 3600 m, Meza 211 (MO). **PUNO**. **Melgar**: Araranca, 4100–4300 m, Pennell 13444 p.p. (GH, NY). **NO EXACT LOCALITY**. 1838–42, Wilkes s.n. (NY).

6. Gnaphalium luteo-album L., Sp. Pl. 851. 1753.
TYPE: Europe, no exact locality, (holotype, LINN, 900. 286–294, not seen).

Annual herbs to 30–50 cm tall; stems whitelanate pubescent, erect to decumbent. Basal leaves sessile; blade oblong-spatulate, ca. 6 cm long, ca. 6 mm wide, apex obtuse; cauline leaves sessile, subamplexicaul to subdecurrent; blade lanceolate, 1–5 cm long, 2–5 mm wide, apex acute, all arachnoid-tomentose. Capitulescences corymbose or subcymose, congested. **Capitula** 2.5–3(–4) mm high, 2.5–4 mm wide; involucres campanulate; phyllaries 2.5–3(–4) mm long, ca. 1 mm wide, oblong, apex obtuse; pistillate florets 100–120, the corollas ca. 2.5 mm long; hermaphroditic florets ca. 30, the corollas ca. 2.5 mm long. Achenes ca. 0.5 mm long, minutely pubescent with multicellular, biserrate trichomes; pappus bristles ca. 2.5 mm long. Chromosome number: $n = 7$ (Kockx-van Roon, M. & J. H. Wieffering, 1982).

Gnaphalium luteo-album is native to central and southern Europe and has been introduced infrequently in South America. In Peru, it is represented only by a few collections from the vicinity of Arequipa. It is readily distinguished from native members of the genus by its annual habit, small capitula, and achenes with multicellular, biseriate trichomes.

AREQUIPA. **Arequipa:** Cerrillo Savandia (Lavancha?) near Laspinas, 14 km N of Arequipa, 2200 m, Eyerdam & Beetle 22147 (MO); vicinity of Arequipa, Rose & Rose 18828 (GH, NY, US), 19011 (NY).

7. ***Gnaphalium polium* Wedd., Chlor. And. 1: 147. 1856.** TYPE: Peru, Dept. Cuzco, no exact locality, C. Gay 1709 (holotype, P, not seen, F neg. 37605, fragment, F).

Prostrate to decumbent, perennial herbs; stems suffrutescent, much-branched at the base, 5–10(–20) cm long. Leaves sessile or slightly decurrent on stem; blade linear to spatulate, 5–15(–20) mm long, 2–2.5(–3.5) mm wide, apex rounded to acute, both surfaces densely tomentose. Capitulescences corymbose in globose clusters, terminal. Capitula ca. 4 mm high, ca. 4 mm wide; phyllaries 3–5-seriate, the outer ovate, 2.5–3 mm long, ca. 1.5 mm wide, apex acute, the inner oblong, 3.5–4 mm long, 1–1.5 mm wide, apex obtuse to rounded; pistillate florets ca. 100, the corollas ca. 2.2 mm long, 3–4-lobed; hermaphroditic florets 8–12, the corollas ca. 2.2 mm long, 5-lobed. Achenes 0.5–0.7 mm long; pappus bristles ca. 3 mm long.

Gnaphalium polium is a highly variable and possibly polyphyletic assemblage of small, high-elevation perennials distributed from northern Peru to Bolivia. Its thickened lignescence stems and dense, white-tomentose pubescence that gives the leaves a thickened circular or rounded form are its most readily observable characteristics. It is readily distinguished from the annual, *G. badium*, in not having its capitulescences immersed in the upper leaves as in that species.

ANCASH. Huaráz: Cerro San Cristóbal, 3800 m, *Evangelista* s.n. (F, MO); Huascarán National Park, Quebrada Shallap, 3690–4100 m, Smith et al. 9646 (F, MO); Quebrada Llaca, 4400–4600 m, Smith et al. 10824 (F p.p., MO). **Recuay:** Km 125, Pativilca to Recuay, 3870 m, Dillon et al. 3110 (F, HUT, MO, NY, TEX, US, USM). **CAJAMARCA. Contumazá:** Pozo Kuán, 3600–3800 m, Sagástegui et al. 10053 (F, HUT, MO). **CUZCO. Quispicanchis:** Auzangate, 4700 m, Rauh & Hirsch PI149 (NY).

Urubamba: Machupicchu, 3350 m, Peyton & Peyton 709 (F, MO); Salcantay, 4500 m, Rauh & Hirsch PI1424 (NY). **JUNIN. Janja:** Hacienda San Juan, entre Janja y Matahuasi, 3200–3300 m, Ferreyra 12901 (MO). **LA LIBERTAD. Santiago de Chuco:** Chota (Motil-Shorey), 3200 m, Sagástegui et al. 11700 (F, HUT, MO). **LIMA. Huarochirí:** Casapalta [Casaplaca], Ball s.n. (GH); 20 km NE of San Mateo, 4050 m, Gentry et al. 19197 (MO). **PUNO. Azángaro:** Tequena, 20 km N de Arapa, Aguilar 417 (MO, USM). **Melgar:** Araranca, 4100–4300 m, Pennell 13444 (F), 13470 (F), 13470a (F).

Doubtful and Excluded Species of *Gnaphalium* in Peru

***Gnaphalium cheiranthifolia* Lam., Encyl. Method. 2: 752. 1786.** TYPE: Uruguay, Montevideo, May 1767, P. Commerson s.n. (holotype, P-LAM, not seen, F neg. 37587, fragment, F).

Pseudognaphalium cheiranthifolia (Lam.) Hilliard & Burt, J. Linn. Soc. Bot. 82(3): 205. 1981.

Cabrera (1978) considered this species to be a southern South American element extending only into southern Bolivia, Brazil, Argentina, and Chile. It is a commonly used name throughout northern South America; the large basal rosette in the photograph of the holotype has not been observed in any Peruvian plants.

***Gnaphalium frigidum* Wedd., Chlor. And. 1: 147. 1856.** TYPE: Bolivia, Dept. Botosí: A. C. V. d'Orbigny 1372 (lectotype, P, designated by Cabrera (1978), not seen, F neg. 37594).

From an examination of the type photograph and the description, this species appears to be quite close to *G. lacteum*, and the two may prove to be conspecific. Material assigned to *G. frigidum* agrees with *G. lacteum* in most respects but lacks the pure white phyllaries associated with the latter species. It is not placed into formal synonymy pending examination of type material.

***Gnaphalium glandulosum* Klatt, Linnaea 42: 129. 1878.** TYPE: Chile ["Peru"], Tacora, F. J. F. Meyen s.n. (holotype, B, probably destroyed, F neg. 15099, fragment, GH).

No material referable to this Chilean species has been examined in this study.

Gnaphalium graveolens Kunth, Nov. Gen. Sp. (fol.) 4: 64. 1820. TYPE: Ecuador, Prov. Chimborazo, Riobamba, A. Humboldt & A. Bonpland 3193 (holotype, p, not seen, IDC Microfiche 6209. 96: III. 2, F neg. 37586), non *G. graveolens* M. Bieb. (1808, 1819), nec *G. graveolens* Fenzl ex Schultz-Bip. (1835-1850), nec *G. graveolens* Henning (1823).

This is one of the most commonly applied names for Andean *Gnaphalium*; however, it is invalid due to an earlier homonym. The type photograph appears to show some characters of *G. elegans*, including its large discolored leaves and large spreading capitulescences. Most of the material previously annotated under this name is here placed with *G. dombeyanum*.

X. Helichrysum

Helichrysum Miller, Gard. Dict., ed. 4, 1754.

TYPE: *Gnaphalium orientale* L. ≡ *Helichrysum orientale* (L.) Gaertn.

Perennial herbs or shrubs, cespitose or suffrutescent, usually lanate, arachnoid, or glandular-pubescent. Leaves alternate, simple, sessile or subpetiolate, the margins entire to subentire. Capitulescences of solitary heads or compound corymb or panicles. Capitula disciform or discoid, heterogamous, female florets fewer than hermaphroditic; involucres cylindrical-campanulate to hemispherical; phyllaries multiseriate, imbricate, persistent, scarious, white or colored distally; receptacles flat, glabrous; pistillate florets (2)-45-55(-850), the corollas narrowly tubular, rarely filiform; hermaphroditic florets 20-200(-700), the corollas tubular, yellow, 5-lobed, the anther bases sagittate, caudate, the terminal appendages oblong to lanceolate, obtuse to rounded, the styles bifid, the branches spatulate, flattened, apex deltoid, the nectary often prominent. Achenes cylindrical, glandular-papillose; pappus bristles scabrid, barbellate, uniseriate, free or united at the base, caducous, stramineous to white. Chromosome numbers: $n = 7, 8, 10, 11, 14, 15, 28, 38$.

Helichrysum is a genus of perhaps 500 species widely distributed in Eurasia, Africa, Madagascar, Australia, and New Zealand. It is closely allied to *Gnaphalium* and the latter is weakly distinguished

from it by the number of pistillate florets outnumbering the hermaphroditic florets. Several members are cultivated as ornamentals in the New World, the following throughout Latin America.

1. **Helichrysum bracteatum** (Vent.) Andrews, Bot. Rip. Sup. 1, t. 428. 1805.

Xeranthemum bracteatum Vent., Jard. Malm. t. 2. 1803. TYPE: not seen.

Perennial herbs to 1 m tall, glabrate or puberulent with short glandular trichomes and sparse, arachnoid hairs; stems striate. Leaves alternate, sessile or the base narrowed to an indistinct winged petiole; blade oblanceolate, to 12 cm long, 1.5-2 cm wide, the margins entire and undulate, both surfaces sparsely arachnoid-pubescent and glandular. Capitulescences of solitary heads, terminal and axillary, braceolate. Capitula ca. 2 cm high, 2.5-5 cm wide; involucres hemispheric; phyllaries multiseriate, subequal or the innermost shorter, oblong to lanceolate, 10-15 mm long, 3-5 mm wide, apex rounded to acute, variously red, orange, yellow, purple, or white, the innermost usually pale; receptacles flat, 15-25 mm in diameter; pistillate florets few or rarely absent; hermaphroditic florets usually over 500, the corollas tubular, 8-10 mm long, the limb slightly expanded, 5-lobed, the base expanded at the nectary. Achenes fusiform to cylindrical, ca. 2 mm long, striate, dark brown, apex dilated; pappus bristles ca. 8 mm long, stramineous to white. Chromosome numbers: $n = 12, 14$.

This species is widely cultivated as an ornamental in flower gardens and for sale in larger cities. It is known as "immortal." No herbarium specimens collected in Peru have been examined in the present study.

XI. Jalcophila

Jalcophila Dillon & Sagást., Brittonia 38: 162.

1986. TYPE: *Jalcophila peruviana* Dillon & Sagást.

Cespitose, perennial herbs; stems branched, densely compact. Leaves alternate, rosulate, sessile, marcescent in age, coriaceous; blades ovate-lanceolate to lanceolate or obdeltate, 3.5-9 mm long, 0.5-2 mm wide, lower surface tomentose-

arachnose, 3-costate, upper surface glabrous, 2-canaliculate, the margins entire. **Capitulescences** of solitary heads, sessile at anthesis, becoming pedunculate at maturity, the peduncles 1–5 mm long, sparsely arachnose. **Capitula** discoid, heterogamous; involucres ovoid to campanulate; phyllaries 2-seriate, equal to subequal, scarious, stramineous, ovate-lanceolate to lanceolate; receptacle plane; pistillate florets 4–6, the corollas filiform, the style branches linear, exserted; hermaphroditic florets 2–6, the corollas tubular, the limb slightly expanded, 4–5-lobed, the anther bases sagittate, the terminal appendage lanceolate, the style branches truncate to clavate, papillose, exserted, the stigmatic lines short and parallel. **Achenes** ovoid, 4-costate, appearing glabrous, scattered biseriate, multicellular, glandular trichomes; pappus bristles uniserial, the bases fused.

Jalcophila contains two species and is known from high-elevation localities in the *páramo* of Volcán Galeras (Dept. Nariño) in southwestern Colombia, Páramo El Angel (Prov. Carchí) in northern Ecuador, the *páramos* of the Cordillera de los Llangantes (Prov. Napo) in central Ecuador, and Pampas de la Julia (Dept. La Libertad) in north-central Peru. This genus appears to lack close relatives among Central and South American Inuleae (Dillon & Sagástegui, 1986).

Reference

DILLON, M. O., AND A. SAGÁSTEGUI A. 1986. *Jalcophila*, a new genus of Andean Inuleae (Asteraceae). *Brittonia*, 38: 162–167.

1. **Jalcophila peruviana** Dillon & Sagást., *Brittonia* 38: 163. 1986. TYPE: Peru, Dept. La Libertad, Prov. Santiago de Chuco, arriba de Quiruvilca, Pampas de la Julia, 3800 m, 15 Nov 1983, A. Sagástegui A., J. Mostacero L., S. López M. & S. Leiva G. 11131 (holotype, HUT; isotype, F). Figure 12.

Cespitose herbs; stems 1–2 cm long. Leaves ovate-lanceolate to obdeltate, 3.5–5 mm long, 0.5–1.5 mm wide, apex rounded, often with tomentose tuft. **Capitulescences** of solitary heads, pedunculate, the peduncles 1–3 mm long. **Capitula** 2–2.5 mm high, 1–1.4 mm wide; involucre campanulate; phyllaries 8–13, subequal, the outer ovate-lanceolate, 2–2.3 mm long, 0.5–0.6 mm wide, apex acute to obtuse, lacerate, the inner lanceolate, 1.8–2.1

mm long, 0.4–0.5 mm wide, apex acute; pistillate florets ca. 4, the corollas ca. 1.25 mm long, the style branches ca. 0.2 mm long; hermaphroditic florets ca. 2, the corollas ca. 1.75 mm long, the limb 5-lobed, the lobes 0.25 mm long, the anthers ca. 1 mm long, the style branches truncate, ca. 0.1 mm long. **Achenes** ovoid, ca. 0.75 mm long, ca. 0.4 mm wide; pappus bristles 1.2–1.5 mm long.

Jalcophila peruviana is known only from the type and one additional locality in northern Peru. Its small, cespitose habit makes it an inconspicuous element within the *jalca* formation. It superficially resembles *Cuatrecasasiella isernii* in general habit; however, it is easily separable from the latter by having alternate leaves and heterogamous capitula. The achenes of this genus were originally described as glabrous; however, they do possess scattered biseriate, multicellular, glandular trichomes common in the tribe.

LA LIBERTAD. Santiago de Chuco: Chota-Shorey, 3250 m, *Sagástegui et al.* 11104 (F, HUT, MO, NY).

XII. Loricaria

Loricaria² Wedd., *Chlor. And.* 1: 165. t. 27. 1856.
TYPE: *Conyzia thuyoides* Lam. ≡ *Loricaria thuyoides* (Lam.) Schultz-Bip.

Shrubs or subshrubs, dioecious, stems erect, branched, densely foliaceous, laterally compressed, narrowly rhomboid to subterete in section. **Leaves** alternate, distichous, sessile; blade laterally compressed, coriaceous, often dorsally carinate, strongly imbricate, appressed to stems, the margins entire, involute. **Capitulescences** of solitary heads, axillary or terminal. **Capitula** discoid, homogamous, sessile; involucre campanulate to cylindrical; phyllaries 2–5-seriate, imbricate, subequal; receptacles paleaceous or naked; masculine florets functionally staminate, the corollas tubular, 5-dentate, the anther bases sagittate, caudate, the styles undivided or bifid, the ovary sterile, the pappus bristles uniserial, the bases fused, the apices clavellate; feminine florets with corollas filiform, 5-fid, the style branches linear, acute, exserted, the ovary fertile, the pappus bristles uniserial, the bases fused, the apices slender and acute. **Achenes** cylindrical, 4–5-costate,

² For additional synonymy, see Cuatrecasas (1954).

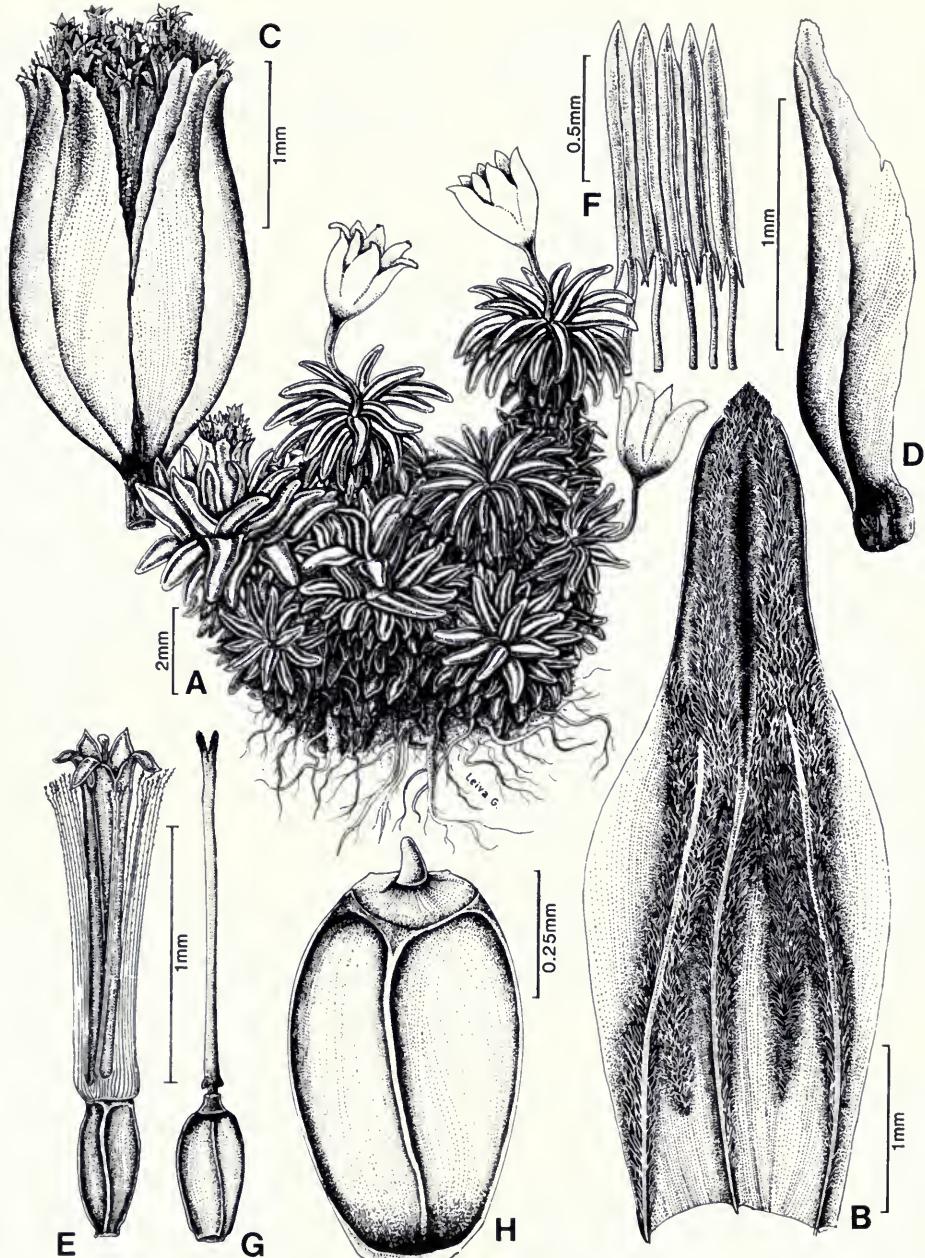


FIG. 12. *Jalcophila peruviana*. A, habit; B, leaf (lower surface); C, capitulum; D, phyllary; E, hermaphroditic floret; F, anthers; G, style and achene of pistillate floret; H, achene. (Drawn from Sagástegui et al. 11131, HUT.)

the surface reticulate, usually glabrous, rarely pubescent with bicellular, capitate-glandular trichomes (e.g., *L. graveolens*).

A genus with approximately 19 species distributed in high-elevation Andean habitats from Co-

lombia to Bolivia. Nine species and one variety are currently recognized from Peru.

Loricaria is distinctive among South American Inuleae in possessing a shrubby habit with laterally compressed, foliaceous stems and densely imbricate, involute, coriaceous leaves. The frequent occurrence of paleaceous receptacles is a character

not found in other Peruvian Inuleae. Cuatrecasas (1954) recognized three sections based primarily upon position of capitula, either terminal or axillary, the presence or absence of receptacular paleae, and achene pubescence.

References

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Key to Species of *Loricaria*

1. Capitulescences of solitary, terminal heads
2. Foliaceous stems slightly flattened, 2–2.5 mm wide (including leaves); leaves ovate in lateral view, 2–2.5 mm long, ca. 1 mm wide, apex obtuse *L. leptothamna*
2. Foliaceous stems strongly flattened, 4–9 mm wide (including leaves); leaves triangular or linear in lateral view, 4–8 mm long, 1.5–2.5 mm wide, apex acute or subacute
3. Leaves triangular or triangular-oblong in lateral view, apices acute
4. Foliaceous stems 7–9 mm wide (including leaves); leaves 7–8 mm long, ca. 2 mm wide, vernicose-ferruginous *L. ferruginea*
4. Foliaceous stems 4–5 mm wide (including leaves); leaves 5–8 mm long, 2–2.5 mm wide, olivaceous green *L. lycopodioides*
3. Leaves linear-oblong in lateral view, apices subacute
5. Foliaceous stems 5–7 mm wide (including leaves); leaves 5–8 mm long, 2–2.5 mm wide, lustrous, green to yellowish white *L. macbridei*
5. Foliaceous stems 4–5 mm wide (including leaves); leaves 4–7 mm long, ca. 1.5 mm wide, brownish roseate *L. lucida*
1. Capitulescences of solitary, axillary heads, or thyrsiform
6. Capitulescences thyrsiform *L. thyrsoides*
6. Capitulescences of solitary heads, axillary
7. Foliaceous stems subterete; leaves with dorsal surfaces tomentose; achenes pubescent with bicellular, capitate-glandular trichomes *L. graveolens*
7. Foliaceous stems flattened; leaves with dorsal surfaces glabrous; achenes glabrous *L. thuyoides*

1. *Loricaria ferruginea* (Ruiz & Pavón) Wedd., Chlor. And. 1: 166. 1856. **Figure 13.**

Molina ferruginea Ruiz & Pavón, Syst. Veget. 211. 1798. TYPE: Peru, “Cordilleras et Punas per Tarmae Cantae et Huarocheri Provincias,” H. Ruiz & J. Pavón 28/10 (holotype, MA, not seen, F neg. 49225; isotype, F).

Shrubs to 80 cm tall, much-branched; stems 7–9 mm wide. **Leaves** triangular in lateral view, 7–8 mm long, ca. 2 mm wide, dorsally carinate, glabrous, vernicose-ferruginous, inner surface lanate. **Capitulescences** of solitary, terminal heads. Masculine **capitula** 6–7 mm high, 4–5 mm wide; involucres campanulate; phyllaries 15–22, ovate-oblong to oblong-linear, 3.5–5 mm long, 1–2 mm

wide, apex obtuse to rounded, glabrous; florets 17–20, the corollas ca. 4 mm long; pappus bristles clavellate, ca. 4 mm long; paleae ca. 6, linear, ca. 5 mm long, scarios, apex obtuse. Feminine **capitula** 6–7 mm high, 2.5–3 mm wide; involucres cylindrical; phyllaries 15–18, ovate-oblong to oblong-linear, 4–6.5 mm long, 1–2 mm wide, apex obtuse, lacerate; florets 12–22, the corollas 4–4.5 mm long; paleae ca. 12, lanceolate-linear, ca. 6 mm long, apex acute, lacerate. **Achenes** 1–1.5 mm long, glabrous; pappus bristles acute, ca. 5 mm long.

Loricaria ferruginea is distributed from central Ecuador to central Peru (3300–4800 m). It is readily distinguished by its vernicose, ferruginous leaves and terminal capitula, and paleaceous receptacles.

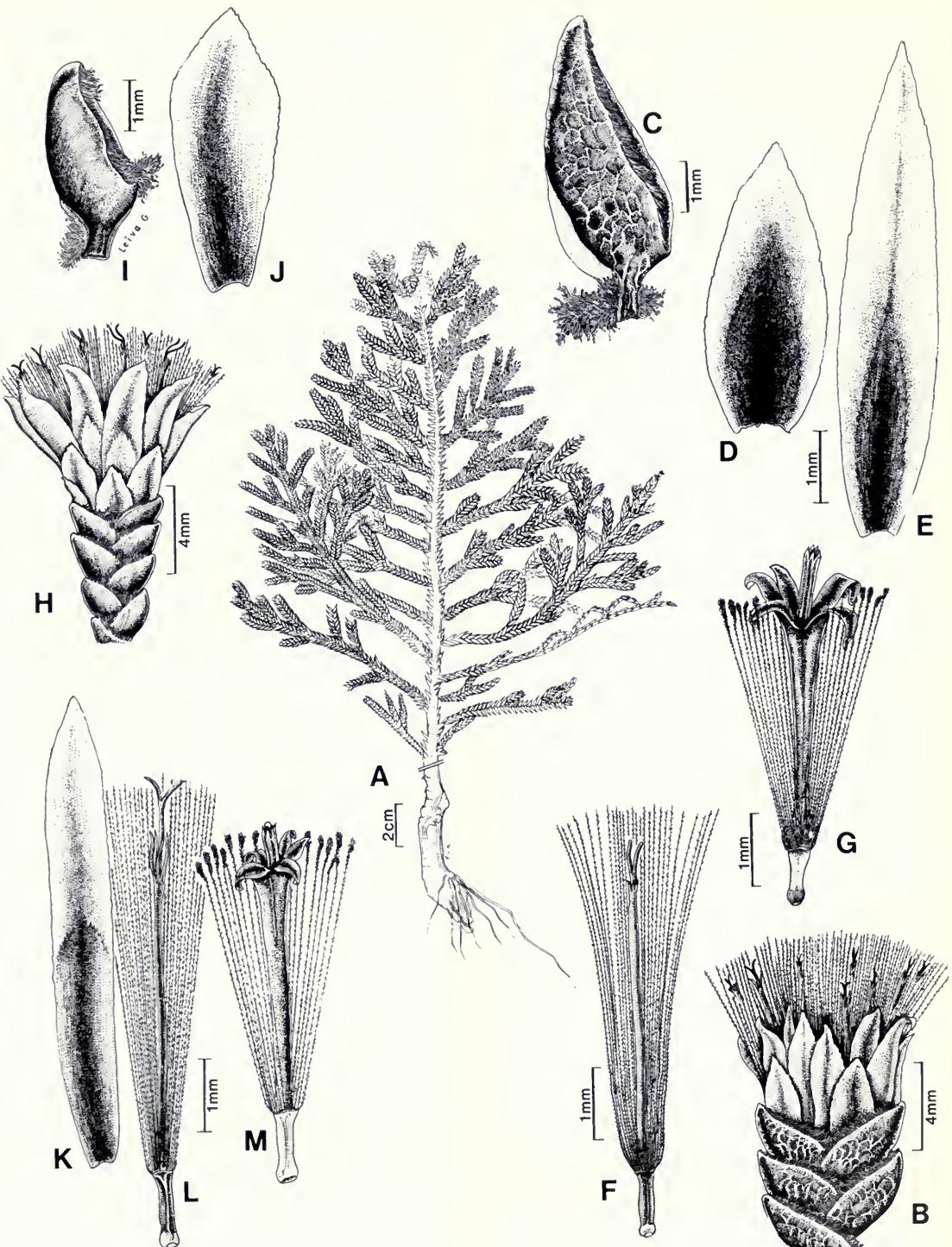


FIG. 13. *Loricaria lucida*. A, habit. (Drawn from Macbride & Featherstone 2171, f). *Loricaria leptothamna*. B, portion of stem with capitulum; C, lateral view of leaf; D, outer phyllary; E, inner phyllary; F, pistillate floret; G, masculine floret. (Drawn from López & Sagástegui 3341, HUT). *Loricaria ferruginea*. H, portion of stem with capitulum; I, lateral view of leaf; J, outer phyllary; K, inner phyllary; L, pistillate floret; M, masculine floret. (Drawn from López 8076, HUT.)

This species is purported to have medicinal properties and is often sold in herb markets. Label data (*Sagástegui & Skillman* 12782) indicate that the "... entire plant is boiled in water and the liquid is then drunk. Used to change a person's character, to make him stronger." In Peru, it is known by the following common names: *chin-chango*, *huallpapa-chaquin*, *palmilla blanca*, and *pata de gallo*.

ANCASH. Bolognesi: Cordillera Raura, 4300 m, *Rauh & Hirsch* P1813 (NY). **Carhuáz:** Huascaran National Park, Quebrada Ulta, 4700 m, *Smith* 11324 (F, MO); Quebrada Ishinca, 4400 m, *Smith et al.* 9534 (F, MO); Vinoyapampa, Quebrada Honda, 4200 m, *Smith et al.* 11600 (F, MO). **Huaráz:** Laguna de Shurup, 3800 m, *Evangelista s.n.* (F, HUT, MO); Cerro San Cristóbal, 3800 m, *Evangelista s.n.* (F, HUT, MO). **Huascarán National Park**, Quebrada Llaca, 4500 m, *Smith et al.* 8994 (F, MO). **Huari:** Huascarán National Park, 3–4 km below Cahuish Tunnel, 4500–4550 m, *Smith & Buddensiek* 11120 (F, MO); 2 km from Cahuish Tunnel, 4400 m, *Smith & Goodwin* 8746 (F, MO); Quebrada Pucaraju, 3900–4200 m, *Smith et al.* 12673 (F, MO); Quebrada Rima Rima, 4200–4440 m, *Smith et al.* 12302 (F, MO). **Huaylas:** Huascarán National Park, Parón Valley, E of lake, 4220–4600 m, *Smith* 11518 (F, MO); Quebrada Alpamayo, 4600–4750 m, *Smith et al.* 9755 (F, MO). **Recuay:** Huascarán National Park, Río Pachacoto drainage, Ojo de Puma spring, 4200 m, *Smith* 11433 (F, MO); Quebrada Quesque, 4550–4600 m, *Smith et al.* 11893 (F). **Yungay:** Laguna de Llac, 4200 m, *Antunez de Mayolo* 321 (F, UC, US, USM); Parque Nacional Huascarán, Porta Chiello, *Bernardi et al.* 16539 (F); Laguna Llanganuco, 4200–4800 m, *Gentry et al.* 37430 (F, HUT, MO); Huascarán National Park, between Lake Llanganuco and Portachuelo, 4420–4620 m, *Smith* 8257 (F, MO); Quebrada Ranincuray, 4000–4300 m, *Smith et al.* 9143 (F, MO); Quebrada Demanda, 4800 m, *Smith & Cautivo* 10271 (F, MO); Laguna Llanganuco-Portachuelo, 4000–5000 m, *Zardini* 1553 (LP, MO). **CAJAMARCA. Cajamarca:** Km 45 Cajamarca-Bambamarca, 3640 m, *Antunez de Mayolo* 364 (UC, US); lagunas de la Choclla, 3800 m, *Llatas & Vásquez* 870 (F, PRG). **San Miguel:** La Quinua-Calquis (jalca), 3300 m, *Sagástegui et al.* 8851 (F, HUT, MO). **LA LIBERTAD. Patáz:** Paso de Alaska, carretera a Tayabamba, 3900 m, *López & Sagástegui* 8178 (GH, HUT, MO). **Santiago de Chuco:** Jalca de Quiruvilca, 4000 m, *López* 8076 (F, GH, HUT, MO, NY); Pampas de la Julia (Quiruvilca-Huamachuco), 4000 m, *Sagástegui & Fabris* 7572 (HUT, MO, NY), *Sagástegui et al.* 11116 (HUT, MO). **PASCO. Pasco:** cerca de Huallay (Junín), ca. 4500 m, *Koepcke s.n.* (F, USM). **LAMBAYEQUE. Ferreñafe:** Incahuasi, *Sagástegui & Skillman* 12782 (F, HUT).

2. *Loricaria graveolens* (Schultz-Bip.) Wedd., Chlor. And. 1: 167. 1856.

Baccharis graveolens Schultz-Bip., Bonplandia 4: 51. 1856. TYPE: Peru, Dept. Cuzco, San Antonio, "rupium fissuris Cordiller. summ. pr. S. Anto-

nio," 17,000 ft, 1854, *W. Lechler* 1815 (holotype, B, probably destroyed; isotypes, F, G-DEL, not seen, F neg. 28509, NY, P, not seen).

Shrubs to 30–50 cm tall, much-branched; stems suberete, ca. 1.5 cm wide (including leaves). Leaves broadly ovate, 5–6 mm long, 3–4 mm wide, dorsally rounded, dorsal surface tomentose, glandular, inner surface lanate. Capitulescences of solitary, axillary heads. Masculine capitula 4.5–5.5 mm high, 2–3 mm wide; involucres campanulate; phyllaries 12–14, obovate-oblong, 4–4.5 mm long, 1–1.5 mm wide, apex expanded and rounded, lacerate; receptacles epaleaceous; florets 6–14, the corollas 3–4 mm long; pappus bristles clavellate, 4–4.5 mm long. Feminine capitula 6–7 mm high, 1.5–2.5 mm wide; involucres cylindrical; phyllaries 13–15, linear, 5–7 mm long, 0.8–1.2 mm wide, apex obtuse or acute, lacerate; receptacles epaleaceous; florets 6–12, the corollas 3.5–4 mm long; pappus bristles acute, ca. 5 mm long. Achenes ca. 1 mm long, pubescent with bicellular, capitate-glandular trichomes.

Loricaria graveolens is endemic to Peru, occurring in *jalca* or *puna* formations from La Libertad to Puno (3900–4400 m). It is distinguished by its densely tomentose leaves, strictly axillary capitula, and achenes pubescent with bicellular, capitate-glandular trichomes.

This species is purported to have medicinal properties and is sold in herb markets, as indicated by label data (*Cerrate* 2920). In Peru, it is known by the following common names: *pata de gallo*, *palmita*, *hualcayo*, *tola*, and *quera*.

AREQUIPA. Arequipa: Charchani [Chachani], 16,400 ft, *Douglass* 5 (F, GH, NY); *Rauh & Hirsch* P544 (NY); Pichupichu, 13,500 ft, *Strafford* 689 (F). **Cailloma. Schmidt s.n.** (F); **Sumbay. Schmidti s.n.** (F). **CUZCO. Canchis:** La Raya, 4400–4500 m, *Pennell* 13517 (F, GH, NY, US). **Espinar:** Yauri, 3900 m, *Vargas* 4380 (F). **LA LIBERTAD.** Santiago de Chuco, Quiruvilca, 4100 m, *López* 1140 (F, USM). **LIMA. Yauyos:** Huacracocha, a 17 kms de Yauyos, 4350–4400 m, *Cerrate & Tovar* 1227 (F, MO, USM). **PUNO. Azángaro:** Checayani [Checayane], 4000 m, *Ellenberg* 548 (US). **Melgar:** Orurillo, *Soukup* 578 (F, US); Lago Titicaca, *Monheim* M45 (NY).

3. *Loricaria leptothamna* (Mattf.) Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 163. 1954. Figure 13.

Tafalla leptothamna Mattf., Notizbl. Bot. Gart. Berlin-Dahlem 10: 775. 1929. TYPE: Peru, Dept. La Libertad, Prov. Patáz, entre Tayabamba y Valle

de Mixiollo [Mishollo], afluente izquierda del Huallaga, 3600–3700 m, 2 Aug 1914, A. Weberbauer 7027 (holotype, B, probably destroyed; isotypes, F, F neg. 49220, GH, F neg. 40754).

Shrubs to 80 cm tall, much-branched; primary stems ca. 1 cm in diameter, the foliaceous stems ± flattened, 2–2.5 mm wide (including leaves). Leaves ovate in lateral view, ca. 2.5 mm long, ca. 1 mm wide, dorsally rounded, dorsal surface glabrous, brownish green, inner surface lanate. **Capitulescences** of solitary, terminal heads. Masculine **capitula** ca. 4 mm high, ca. 3 mm wide; involucres campanulate; phyllaries 12–13, obovate-oblong to oblong, 3–4 mm long, 0.5–1.5 mm wide, apex expanded and rounded, lacerate; receptacles epaleaceous; florets ca. 10, the corollas 2.5–3 mm long; pappus bristles clavellate, 3–3.5 mm long. Feminine **capitula** 5–6 mm high, ca. 3 mm wide; involucres cylindrical; phyllaries ca. 12, elliptic-oblong to oblong-linear, 3.5–5.5 mm long, 1–1.5 mm wide, apex acute, lacerate; receptacles epaleaceous; florets 3–9, the corollas 3.5–4 mm long; pappus bristles acute, ca. 4 mm long. **Achenes** 1–1.5 mm long, glabrous.

Loricaria leptothamna is endemic to Peru and known only from a few collections in Departments of Amazonas, Cuzco, and La Libertad. It has the shortest leaves of any Peruvian species, approached only by those of *L. thuyoides* var. *microphylla* (Wedd.) Cuatr. and *L. ollgaardii* Dillon & Sagást. of Colombia and Ecuador, respectively. This character, combined with terminal capitula and epaleaceous receptacles, makes *L. leptothamna* a readily distinguishable member of the genus.

A series of collections from between Cajamarca and Hualgayoc superficially match *L. leptothamna*; however, they differ in several characteristics including: (1) leaves more ovate-oblong in lateral view and dorsally convex, and (2) masculine capitula with fewer florets (5 versus 12). Further study may prove these collections worthy of taxonomic recognition at subspecific rank in *L. leptothamna*.

AMAZONAS. Chachapoyas: ca. 30 km SW of Leimebamba on road to Balsas, 3540 m, Dillon & Turner 1738 (F, HUT, MO, USM); Jalca de Calla-Calla, 3650 m, Sagástegui 7480 (HUT, US); Sánchez & Ruiz 548 (CPUN, F). **CAJAMARCA.** Cajamarca: La Pajuela (carretera Cajamarca-Hualgayoc), 3500 m, López et al. 7832 (HUT, MO-2); ruta Cajamarca-Hualgayoc, 3500 m, Sánchez 776 (CPUN, F). **Celendín:** cumbre Komulca, entre Cajamarca y Celendín, 3800–3850 m, Ferrerya 13250 (USM). **LA LIBERTAD.** Bolívar: Travesía Laplap, 3600 m, López

& Sagástegui 3341 (GH, HUT, MO, US). **CUZCO.** La Convención: Cordillera Vilcabamba, 3400 m, Dudley 11185 (F, MO, USM).

4. **Loricaria lucida** Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 163. 1954. TYPE: Peru, Dept. Huánuco, Prov. Huánuco, 15 mi NE of Huánuco, about 15,000 ft, 12–22 Jun 1922, J. F. Macbride & W. Featherstone 2171 (holotype, F, F neg. 40751; isotypes, GH, US). Figure 13.

Shrubs 50–80 cm tall, much-branched; stems flattened, 4–5 mm wide (including leaves). Leaves linear-oblong in lateral view, 4–7 mm long, ca. 1.5 mm wide, dorsally carinate, apex subacute to obtuse, dorsal surface glabrous, vernicose, reddish brown, inner surface lanate. **Capitulescences** of solitary, terminal heads. Masculine **capitula** 4.5–5 mm high, ca. 3 mm wide; involucres campanulate; phyllaries ca. 13, ovate to ovate-oblong, 3–4.5 mm long, 1.5–2 mm wide, apex obtuse, lacerate; florets 11–13, sterile, the corollas 3.5–4 mm long; pappus bristles clavellate, 3–3.5 mm long; paleae oblong, ca. 4 mm long, scarious, apex obtuse. (Feminine individuals not observed.)

Loricaria lucida is a rare Peruvian endemic known only from the type and one other collection from central Peru. It most closely resembles *L. ferruginea* but differs from that species in having much narrower stems (4–5 mm versus 7–9 mm) and linear-oblong leaves. Feminine individuals were not encountered by Cuatrecasas (1954) or in this study.

JUNÍN. Huancayo: Santo Domingo de Acobamba, 4300 m, Ochoa 166 (F, USM).

5. **Loricaria lycopodinea** Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 164. 1954. TYPE: Peru, Dept. Huánuco, Prov. Dos de Mayo, San Carlos Mines, 6 mi W of Huallanca, ca. 9000 ft, J. F. Macbride 2471 (holotype, F, F neg. 40750; isotypes, GH, US).

Shrubs to 80 cm tall, much-branched; stems flattened, 4–6 mm wide (including leaves). Leaves triangular-oblong in lateral view, 5–8 mm long, 2–2.5 mm wide, dorsally carinate, apex subacute, dorsal surface glabrous, olive-green, inner surface lanate. **Capitulescences** of solitary, terminal heads.

Masculine **capitula** 4–5 mm high, 3–3.5 mm wide; involucres campanulate; phyllaries 15–20, ovate to elliptic or oblong, 3–3.5 mm long, 1.2–2 mm wide, apex obtuse, lacerate; florets 16–22, the corollas 4 mm long; pappus bristles clavellate, ca. 4 mm long; paleae ca. 6, oblong-linear, 4–5 mm long, scarious, apex obtuse. Feminine **capitula** 6–7.5 mm high, ca. 4 mm wide; involucres cylindrical; phyllaries ca. 12, the outer oval to ovate, ca. 4 mm long, ca. 2 mm wide, the inner lanceolate, 6–6.5 mm long, 1–1.5 mm wide, apex acute; receptacles epaleaceous; florets 11–13, the corollas ca. 5 mm long; pappus bristles acute, ca. 5 mm long. Achenes ca. 1.3 mm long, glabrous.

Loricaria lycopodinaea is a Peruvian endemic known from a few collections from north-central Peru. It most closely resembles *L. ferruginea* but differs in possessing narrower stems.

ANCASH. Yungay: Cordillera Blanca, Llanganuco, Bathgate 16 (USM). **LA LIBERTAD.** Huamachuco: road to Huamachuco, 8 km E of Quiruvilca, 4100 m, *Hutchison et al.* 6139 (F, GH, MO, NY, UC); El Portachuelo Pass, S of Cerro Huayllillas, 4000 m, West 8136 (GH, MO, UC). **JUNÍN.** Yauli: Oroya, *Maisch s.n.* (USM).

6. **Loricaria macbridei** Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 164. 1954. TYPE: Peru, Dept. Junín, Prov. Junín, San José, ca. 13,000 ft, *J. F. Macbride & W. Featherstone* 1093 (holotype, F, F neg. 40752; isotypes, GH, US).

Shrubs to 60 cm tall, much-branched; stems flattened, 5–7 mm wide (including leaves). Leaves linear-oblong in lateral view, 5–8 mm long, 2–2.5 mm wide, dorsally carinate, apex subacute, curved inward, dorsal surface glabrous, opaque, olive to ochraceous, inner surface densely lanate. Capitulescences of solitary, terminal heads. Masculine **capitula** 6–7 mm high, 3–4 mm wide; involucres campanulate; phyllaries 12–14, elliptic to oblong, (4–)5–6 mm long, 1–2 mm wide, apex obtuse, lacerate; florets 10–24, sterile, the corollas ca. 4 mm long; pappus bristles clavellate, ca. 4 mm long. Feminine **capitula** 5–6 mm high, 1.5–2.5 mm wide; involucres cylindrical; phyllaries 13–22, elliptic to oblong-linear, (3–)5–6 mm long, 1–2 mm wide, apex subacute; florets 20–26, the corollas 4–4.5 mm long; pappus bristles acute, ca. 4 mm long; paleae ca. 12, linear, ca. 6 mm long, 0.6–1 mm

wide, apex acute, lacerate. Achenes ca. 1.5 mm long, glabrous.

Loricaria macbridei is a Peruvian endemic known from three collections. This is the only species that possesses paleas within the feminine capitula, but lacks them in the masculine capitula.

CUZCO. Paucartambo: Dist. Marcachea, Escalerayoc, 3700–4200 m, *Vargas* 11181 (F, UC). **NO EXACT LOCALITY.** *Soukup s.n.* (F).

7. **Loricaria thuyoides** (Lam.) Schultz-Bip., Bonplandia 8: 258. 1860.

Conyza thuyoides Lam., Encycl. 2: 90. 1786. TYPE: Peru, no exact locality, *J. de Jussieu* 42 (holotype, P, not seen, F neg. 37760).

Molina incana Ruiz & Pavón, Syst. Veget. 211. 1794. TYPE: Peru, Dept. Huánuco, Prov. Pachitea, Pozuzo, *H. Ruiz & J. Pavón* 28/18 (holotype, MA, not seen; isotype, F).

Shrubs to 1 m tall, much-branched; stems slightly to strongly flattened, 4–10 mm wide (including leaves). Leaves linear in lateral view, 5–10 mm long, 1–1.5 mm wide, dorsally carinate, apex subacute to obtuse, dorsal surface glabrous, green to gray-green, inner surface lanate. Capitulescences of solitary, axillary heads. Masculine **capitula** 4–5 mm high, 2–2.5 mm wide; involucres campanulate; phyllaries 7–10, oblong to oblanceolate, 3–4 mm long, 1–1.2 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 5 or 12–14, the corollas ca. 3 mm long; pappus bristles clavellate, ca. 3 mm long. Feminine **capitula** 4–5.5 mm high, 1–1.5 mm wide; involucres cylindrical; phyllaries 11–13, oblong, 4–5 mm long, ca. 1 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 5 or 10–12, the corollas 4–4.5 mm long; pappus bristles acute, ca. 5 mm long. Achenes 1–1.5 mm long, glabrous.

Loricaria thuyoides is widely distributed from Colombia to Bolivia and in Peru ranges from Amazonas to Cuzco, 3000–4500 m. This species possesses considerable morphological variability, especially in the width of the foliaceous stems and the number of florets per head. Several varieties have been recognized, including *L. thuyoides* var. *thyrsoides* Cuatr., a taxon here treated as a distinct species (Dillon & Sagástegui, 1986). Two morphological varieties are recognized.

Key to Varieties of *Loricaria thuyoides*

1. Foliaceous stems strongly flattened, narrowly rhomboid in section; masculine and feminine capitula with 10–14 florets var. *thuyoides*
1. Foliaceous stems slightly compressed, subterete in section; masculine and feminine capitula with ca. 5 florets var. *stuebelii*

7a. *Loricaria thuyoides* var. *thuyoides*

Foliaceous stems strongly flattened, narrowly rhomboid in section, 4–10 mm wide (including leaves). Leaves 5–10 mm long, 1–1.5 mm wide, apex obtuse to subobtuse. Masculine **capitula** 4–5 mm high, 2–2.5 mm wide; florets 12–14. Feminine **capitula** 5–5.5 mm high, 1–1.5 mm wide; florets 10–12. Chromosome number: $n =$ ca. 14 (Turner et al., 1967).

Variety *thuyoides* has a wide distribution throughout the Andean Cordillera and is distinctive with its strongly flattened stems and axillary capitula with 10–14 florets.

AMAZONAS. Bagua: Cordillera Colán NE of La Peca, 10,400 ft, Barbour 3546 (F, MO). Chachapoyas: Cerros de Calla-Calla, between Leimebamba-Balsas road pass and the “camino de herradura,” 3500–3750 m, Wurdack 1189 (F, GH, NY, UC, US); ca. 30 km SW of Leimebamba on road to Balsas, ca. 3540 m, Dillon & Turner 1738A (F). **AYACHUCO.** Huamanga: above Sotorabamba, Weberbauer 5460 (F, GH). CUZCO. Quispicanchis: Ampatuni, 4400–4500 m, Vargas 12157 (us). Urubamba: Pumawanca, 3900–4350 m, Vargas 13701 (us). **LA LIBERTAD.** Bolívar: Nevado de Cajmarquilla, Ferreyra 1291 (F, MO, USM); Ferreyra 1293 (MO, USM). **HUANUCO.** Huánuco: Sariapampa, 3600 m, Woytkowski 34305 (F, HUT, MO, UC, US, USM). **Prov. Unknown:** Shishimay, ca. 3000 m, Woytkowski s.n. (F). **JUNÍN.** Yauli: cerca Ticio, ferrocarril Lima-La Oroyo, Esposto s.n. (F, USM). **PASCO.** Oxapampa: Cordillera Yanachaga, 3150–3300 m, Smith 7701 (F, MO); between Santa Barbara and Lanturachi, 3000 m, Smith 8196 (F, MO). **SAN MARTÍN.** Mariscal Cáceres: Puerto del Monte, 3500 m, Young 1799 (F).

7b. *Loricaria thuyoides* var. *stuebelii* (Hieron.) Cuatr.

Loricaria stuebelii Hieron., Bot. Jahrb. Syst. 21: 346. 1896. TYPE: Peru, “prope Pishenuña, 3200 m, et prope Calle-Calle, 3400–3600 m, inter Pascaс Mayo et Moyobamba,” A. Stuebel 53 (holotype, b, probably destroyed, F neg. 15139).

Foliaceous stems slightly flattened, subterete in section, 5–8 mm wide (including leaves). Leaves 7–10 mm long, ca. 1 mm wide, apex subacute.

Masculine **capitula** ca. 4 mm high, ca. 2 mm wide; florets ca. 5. Feminine **capitula** ca. 4 mm high, ca. 1.5 mm wide; florets ca. 5.

Variety *stuebelii* is readily distinguished from the typical variety by possessing heads with only 5 florets. This variety may, upon further study, prove to be worthy of specific status. It most closely resembles *L. pauciflora* Cuatr. of Ecuador, a species with only four (4) female florets per head.

LA LIBERTAD. Bolívar: Las Quinuas, 3350 m, López & Sagástegui 3345 (HUT, MO). **HUÁNUCO.** Huánuco: Pachitea, Tambo de Vaca, 13,000 ft, Macbride 4385 (F, GH, US).

8. *Loricaria thyrsoidaea* (Cuatr.) Dillon & Sagást., Phytologia 59: 230. 1986.

Loricaria thuyoides var. *thyrsoidaea* Cuatr., Feddes Repert. Spec. Nov. Regni Veg. 56: 170. 1954. TYPE: Peru, Dept. Lima, Prov. Canta, near Antaicocha, Cerro Colorado, E of Canta, 4000–4100 m, 20 Jun 1925, F. W. Pennell 14685 (holotype, F; isotypes, GH, NY, US).

Shrubs to 1 m tall, much-branched; primary stems 7–8 cm in diameter, the foliaceous stems flattened, 5–7 mm wide (including leaves). Leaves triangular-oblong in lateral view, 5–7 mm long, 1.5–2 mm wide, dorsally carinate, apex obtuse, dorsal surface glabrous, vernicose, greenish, inner surface lanate. **Capitulescences** thyrsiform, terminal and axillary. Masculine **capitula** 5–7 mm high, 3–4 mm wide; in volucres campanulate; phyllaries 20–22, obovate-oblong to oblanceolate, 4.5–5.5 mm long, 1–2 mm wide, apex rounded, lacerate; receptacles epaleaceous; florets 16–20, the corollas 4–4.5 mm long; pappus bristles clavellate, 4.5 mm long. Feminine **capitula** 7–8 mm high, 2–3 mm wide; involucres cylindrical; phyllaries 17–21, oblong to oblong-linear, 4–5.5 mm long, 1–1.5 mm wide, apex obtuse, lacerate; receptacles epaleaceous; florets 12–15, the corollas ca. 4 mm long; pappus bristles acute, ca. 5 mm long. Achenes 1–1.5 mm long, glabrous.

Loricaria thyrsoides is distributed from central to southern Peru. The thyrsoid capitulescences of this species are unique for the genus and quite unlike those of all other members. In the Department of Lima, it is known by the common name of *matara*.

CUZCO. Quispicanchis: Marcapata, 10,000 ft, *Stafford* 988 (F). **JUNÍN.** Yauli: Tucto, cerca a Morococha, 4800–4900 m, *Weberling* 5907 (USM). **LIMA.** Canta: cerca Canta, *Sánchez* 043 (F, USM). Huarochirí: Dist. San Mateo, Río Blanco, ca. 15,000 ft, *Macbride* 2985 (F, GH); *Saunders* 388 (GH, NY). **Prov. Unknown:** Auquimarca, 5000 m, *Geraldo* 3274 (F).

XIII. *Lucilia*

Lucilia Cass., Bull. Soc. Philom. Paris 1817: 32. 1817. TYPE: *Serratula acutifolia* Poir. ≡ *Lucilia acutifolia* (Poir.) Cass.

Perennial herbs, erect or ascending, less often cespitose, generally lanate or tomentose. Leaves alternate and imbricate or rosulate, the margins entire. Capitulescences glomerulate, few-headed or of solitary, terminal heads. Capitula disciform; involucres cylindrical to ovoid; phyllaries 4–6-seriate, imbricate, scarious, hyaline at margins, the inner gradually longer; receptacle plane, naked; pistillate florets 10–155, multiseriate, the corollas filiform; hermaphroditic florets 3–23, the corollas narrowly tubular, 5-lobed, the anther bases sagittate, caudate, the terminal appendages ovate, the style branches rounded, dorsal surfaces puberulent. Achenes obovoid to turbinate, sericeo-pubescent; pappus bristles scabrid, barbellate, the bases fused, deciduous together as a unit. Chromosome number: $n = 14$ (Freire, 1986b).

Key to Species of *Lucilia*

- Leaves spatulate, plane to falcate, 10–20 mm long, 1–2 mm wide *L. kunthiana*
- Leaves linear, pleated or canaliculate, 5–15 mm long, 0.8–1 mm wide *L. conoidea*
- 1. *Lucilia conoidea* Wedd., Chlor. And. 1: 154. 1856. TYPE: Peru, Dept. Cuzco, "cordillères du département de Cuzco," C. Gay s.n. (holotype, P, not seen, fragment, F). Figure 14, A–G.**

Cespitose, perennial herbs; stems much-

A genus of perhaps 12 species distributed throughout South America, but with a center of diversity in Argentina, southeast Brazil, Uruguay and Paraguay; two are known from Peru.

There has been considerable difference of opinion as to the generic limits between *Lucilia* and *Belloa* (see discussion under *Belloa*). The gross appearance of some members of each genus is quite similar and especially those which occupy high-elevation Andean habitats. Cassini's original description of *Lucilia* described sericeous achenes; however, Freire (1986, 1987) expanded the genus and transferred several species possessing achenes with biseriate, multicellular, glandular trichomes to the genus. Sagástegui and Dillon (1985) removed from *Lucilia* all members with glandular achenes (e.g., *L. longifolia*) and placed them in *Belloa*. In the present treatment, only those taxa with consistently sericeous achenes are included in *Lucilia*.

The monotypic genus *Novenia* was established by Freire (1986a) to accommodate one species previously placed in *Lucilia* as *L. tunariense* (Kuntze) K. Schumann (= *N. acaulis*).

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FREIRE, S. E. 1986a. *Novenia*: Nuevo género de Inuleae (Compositae). Bol. Soc. Argent. Bot., 24: 295–304.
—. 1986b. Números cromosómicos en el género *Lucilia* (Compositae, Inuleae). Bol. Soc. Argent. Bot., 24: 411–413.
—. 1986c. Revisión del género *Lucilia* (Compositae, Inuleae). Darwiniana, 27: 431–490.
SAGÁSTEGUI-ALVA, A., AND M. O. DILLON. 1985. New species and combinations in *Belloa* (Inuleae-Asteraeae). Phytologia, 58: 392–400.
ZARDINI, E. 1987. A new combination in *Lucilia* (Compositae-Inuleae). Ann. Missouri Bot. Gard., 74: 431.

branched, decumbent. Leaves imbricate, sessile; blade linear to spatulate, 5–15 mm long, 0.8–1 mm wide, marcescent, the base slightly expanded and clasping stem, pleated or canaliculate, apex obtuse, mucronate, lower surface arachnoid-tomentose, glabrescent, upper surface densely silvery-tomentose. Capitulescences of solitary heads, terminal.

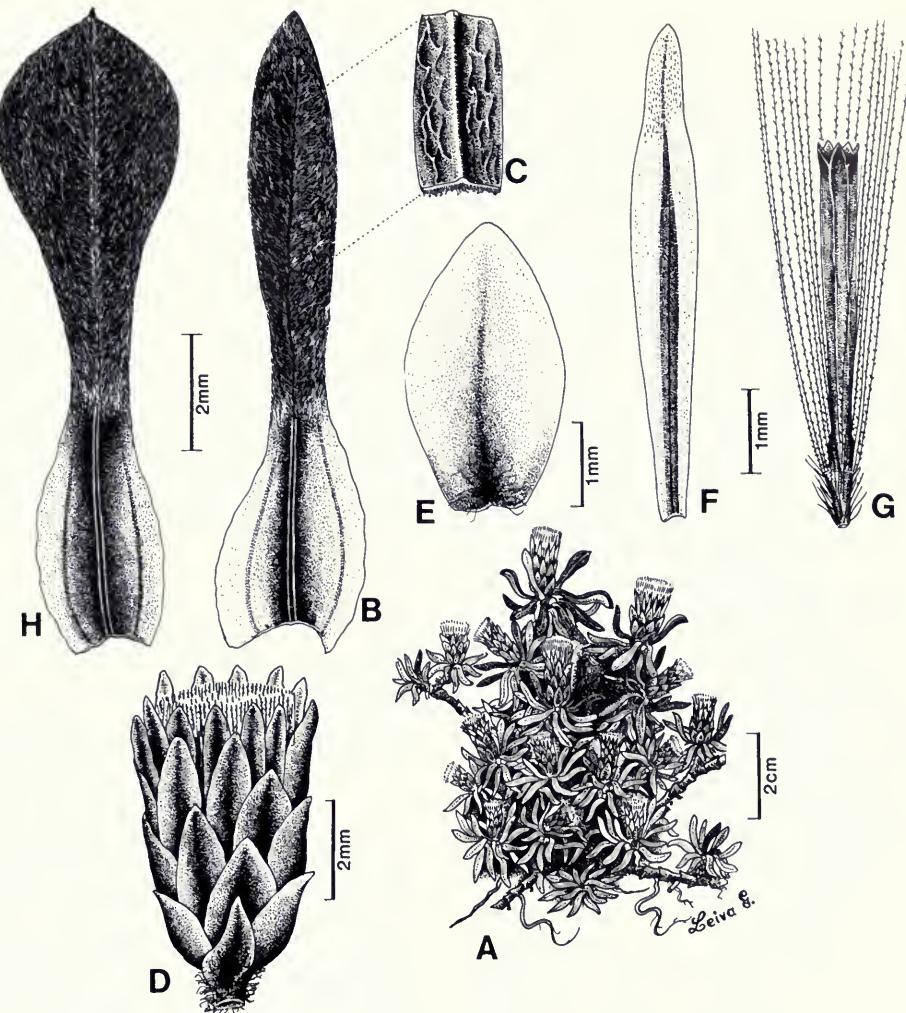


FIG. 14. *Lucilia conoidea*. A, habit; B, leaf, upper surface; C, leaf enlargement, lower surface; D, capitulum; E, outer phyllary; F, inner phyllary; G, hermaphroditic floret. (Drawn from Dillon et al. 1082, HUT). *Lucilia kunthiana*. H, leaf, lower surface. (Drawn from Dillon & Turner 1392, HUT.)

Capitula 7–8 mm high, ca. 4 mm wide; phyllaries 35–40, 5-seriate, the outer ovate, 3–4 mm long, 1.5–2 mm wide, concave, dorsally lanuginous, apex obtuse, the inner linear, ca. 6 mm wide, 0.8–1 mm wide; pistillate florets 40–50, the corolla 4–5 mm long; hermaphroditic florets 5–6, the corollas 4–5 mm long. Achenes obovoid, ca. 1 mm long, pilose, brown; pappus bristles ca. 6 mm long.

Lucilia conoidea is known from three collections in southern Peru and northern Bolivia. It approaches *L. kunthiana* in general appearance but is distinctive in having leaves that are pubescent on the upper surface and glabrescent below, the reverse of the usual condition in *Lucilia*. Although

Lucilia conoidea was reduced to synonymy of *L. kunthiana* (as *L. pusilla*) by Freire (1986b), it is here accepted as distinct and readily recognizable.

PUNO. Carabaya: ca. 20 km SE of Macusani, ca. 4500 m, Dillon et al. 1082 (F, HUT, LP, MO, NY, USM); Lago Titicaca, 4000 m, Monheim M157 (NY).

2. ***Lucilia kunthiana* (DC.) Zardini, Ann. Missouri Bot. Gard. 74: 431. 1987. Figure 14, H.**

Conyza kunthiana DC., Prodr. 5: 379. 1836. (*nomen novum* for *Conyza pusilla* Kunth).

Gnaphalium kunthianum (DC.) Kuntze, Revis. Gen. Pl., 3: 152. 1898.

Lucilia pusilla (Kunth) Hieron., Bot. Jahrb. Syst., 29: 29. 1900.

Conyza pusilla Kunth, Nov. Gen. Sp. (fol.) 4: 54. 1820. TYPE: Ecuador, Prov. Pichincha, "crescit regione alpina Regni Quitensis," A. Humboldt & A. Bonpland s.n. (holotype, P, not seen, IDC Microfiche 6209. 95: II. 3, F neg. 37649). Non Houttuyn (1779).

Lucilia lehmannii Hieron., Bot. Jahrb. Syst. 19: 51. 1895. TYPE: Ecuador, Prov. Azuay, Páramo del Cajas, 3600–4200 m, F. C. Lehmann 4649 (holotype, B, probably destroyed, F neg. 15126).

Cespitose perennial herbs; stems much-branched, decumbent, densely foliaceous. Leaves imbricate, sessile; blade linear-spatulate to spatulate, 10–20 mm long, 1–2 mm wide, plane to falcate, marcescent, the base attenuate and clasping stem, apex rounded, both surfaces tomentose. Capitulae of solitary heads, terminal. Capitula 7–8 mm high, ca. 5 mm wide; phyllaries ca. 35, 5–6-seriate, brownish black to stramineous, the outer ovate, ca. 3 mm long, ca. 2 mm wide, concave, dorsally glabrescent, apex obtuse, the inner linear, 7–8 mm wide, ca. 1 mm wide, glabrous, apex acute; pistillate florets ca. 50, the corolla filiform, 5–6 mm long; hermaphroditic florets ca. 8, the corolla narrowly tubular, 4–5 mm long. Achenes obovoid, ca. 1 mm long, pilose, brown; pappus bristles 6–7 mm long.

Lucilia kunthiana is distributed throughout high-elevation Andean habitats from Ecuador to Bolivia, 3000–4800 m. In Peru, it has a wide range and is a relatively common element in *jalca* and *puna* formations, 3000–4600 m.

ANCASH. Bolognesi: Quebrada Cancha-cancha, cerca a Colca, 14,300 ft, Roberts 69 (usm). **Carhuáz:** Huascarán National Park, Quebrada Honda, between Vinoyapampa and Portachuelo Honda, 4200–4400 m, Smith et al. 11669 (F, MO). **Huari:** Huascarán National Park, Quebrada Pucaraju, 3900–4200 m, Smith et al. 12681. **Huaylas:** Huascarán National Park, Parón Valley, E of lake, 4200 m, Smith 11483 (F, MO). **Recuay:** Huascarán National Park, Río Pachacoto drainage, moraine below Nevado Pasto Ruri, 4700 m, Smith 11426 (F, MO). **APURÍMAC.** No Exact Locality: Rauh & Hirsch P1426 (NY p.p.). **AYACUCHO.** Parinacochas: 57 km W of Cotaruse, ca. 111 km E of Puquio, 4100 m, Gentry et al. 23300 (F, MO, USM). **CAJAMARCA.** Cajabamba: Cajabamba-Luchubamba, 3800 m, Sagástegui et al. 11163 (F, HUT, MO). **CUZCO.** Cuzco: Cordillera Verónica (Vilcanota), 4100 m, Rauh & Hirsch P999 (NY). Quispicanchis: La-bramarca, 3800 m, Rauh & Hirsch P1222 (NY); Auzangate, 4600 m, Rauh & Hirsch P1259 (NY p.p.). **Urubamba:**

Machupicchu, 4430 m, Peyton & Peyton 102 (MO); Olantaytambo, 4285 m, Peyton & Peyton 1136 (F, MO). **HUANCAVELICA.** Huancavelica: San José de Acobambilla, 4000 m, Cerrate & Marshall 3811 (USM). **HUÁNUCO.** Huánuco: 6 mi S of Mito, 10,500 ft, Macbride & Featherstone 1861 (F). **JUNÍN.** Jauja: Mt. La Junta, near Huancayo, ca. 4700 m, Killip & Smith 22109 (F, NY). Junín: ca. 6 km N of La Cima, ca. 56 km N of La Oroya, 10 km S of Junín, 4100 m, Dillon & Turner 1392 (F, HUT, MO, TEX, USM); Atocsayco, 4166 m, Johns 81–85 (F, MICH, USM). Yauli: Km 125 E of Casapalca, 14,250 ft, Davidson & Jones 9005 (us); ca. 17 km E of La Oroya on road to Tarma, 3900–4000 m, Dillon & Turner 1466 (F, MO, USM); 15 km SSW of La Oroya, 3850 m, Iltis & Ugent 9 (UC, US); Laguna Pomacocha, 4200 m, Ochoa 606 (GH); near Atocsayco, ca. 4200 m, Pearsall 888 (F). **PASCO.** Pasco: Cerro de Pasco, ca. 14,000 ft, Macbride & Featherstone 2400 (F). **PUNO.** Melgar: between Santa Rosa and Ayaviri, ca. 3500 m, Dillon et al. 1069 (F, LP, USM); Chuquibambilla, 3900–4000 m, Pennell 13371 (F). **Puno:** Cerros de Puno, 3000–3900 m, Tovar s.n. (USM). NO EXACT LOCALITY. Ellenberg 626 (USM), Soukup 3779 (F).

XIV. *Mniodes*

Mniodes A. Gray ex Benth. & Hook., Gen. Pl. 2: 301. 1876. TYPE: *Mniodes andina* (A. Gray) A. Gray ex J. D. Hook. & A. B. Jackson.

Antennaria Gaertn. sect. *Mniodes* A. Gray, Proc. Amer. Acad. Arts 5: 138. 1861.

Subshrubs or perennial herbs, suffrutescent, cespitose, cushion-shaped, dioecious; stems much-branched, often tightly compacted. Leaves densely imbricate, appressed to stems, sessile; blade 2–5 mm long, both surfaces tomentose to villose, often glabrescent, the margins entire. Capitulae of solitary heads, terminal or subterminal. Capitula discoid, homogamous, sessile; involucres cylindrical; phyllaries multiseriate, imbricate, subequal, scarious, stramineous, rarely with white petaloid apex; receptacles naked; masculine florets with the corollas tubular, apically dilated, 5-fid, the anthers sagittate, caudate, the style branches obtuse, the ovary sterile, the pappus bristles uniserial, clavellate, rarely slender and acute; feminine florets with the corollas filiform, 5-fid or truncate, the style branches linear-oblong, dorsally pubescent, apex subobtuse, the ovary fertile, the pappus bristles uniserial, apex slender and acute. Achenes fusiform to ovoid, 4-angled, brown, usually pubescent with biseriate, multicellular, capitate-glandular trichomes or glabrous.

Mniodes is a distinctive genus of 4 species known only from the Peruvian and adjacent Chilean Andes (2730–4900 m).

Reference

CUATRECASAS, J. 1954. El género *Mniodes*. Folia Biol. Andina, 1: 1–7.

Key to Species of *Mniodes*

1. Leaves obtrullate or fan-shaped, 4–5 mm long, 3–5 mm wide, 3-nerved; capitulescences subterminal, axillary *M. pulvinulata*
1. Leaves oblong to obovate or obovoid, 3–4 mm long, (1–)1.5–3 mm wide, 1-nerved; capitulescences terminal
 2. Leaves oblong to subobovate, 1–1.2(–1.7) mm wide, apex truncate to rounded; achenes glabrous *M. andina*
 2. Leaves obovate to obovoid, 1.2–2 mm wide, apex subacute to rounded; achenes glabrous or glandular
 3. Leaves obovate-oblong, apex subacute, often briefly mucronate; achenes glandular *M. aretioides*
 3. Leaves ovoid to elliptic, apex obtuse to rounded; achenes glabrous *M. coarctata*

1. ***Mniodes andina* (A. Gray) A. Gray ex J. D. Hook. & A. B. Jackson, Ind. Kew. 2: 250. 1893. Figure 15.**

Antennaria andina A. Gray, Proc. Amer. Acad. Arts 5: 138. 1861. TYPE: Peru, Dept. Junín, Prov. Yauli, Alpamarca, *Wilkes s.n.* (holotype, GH; isotypes, MO, NY, US).

Suffrutescent subshrub, pulvinate-cespitoso; stems foliaceous, cylindrical, 3–5 mm in diameter (including leaves). Leaves with blades oblong to subobovate, 3–4 mm long, 1.0–1.2(–1.7) mm wide, 1-nerved, apex rounded or rarely truncate, both surfaces incano-villous. Capitulescences of solitary heads, terminal. Masculine capitula 3–3.5 mm high, ca. 1.5 mm wide; phyllaries 7–8, oblong-linear, 3.2–3.5 mm long, 0.6–0.8 mm wide, subequal, apex obtuse, lacerate; florets ca. 7, the corollas ca. 2.5 mm long; pappus bristles ca. 3 mm long, clavellate. Feminine capitula ca. 4 mm high, ca. 1.5 mm wide; phyllaries 8–10, oblong-linear, 3–3.5 mm long, 0.8–1 mm wide, subequal, apex obtuse, lacerate; florets 10–14, the corollas 1.8–2.3 mm long; pappus bristles 2.5–3 mm long, acute. Achenes ca. 1.6 mm long, glabrous.

Mniodes andina is distributed from central to southern Peru. It most closely resembles *M. coarctata*, but differs from that species in having leaves widest at the apex. This species forms large rounded cushions of stems that are easily separated.

ANCASH. Bolognesi: Dist. Ticllos, paso de Chonta, 4400 m, *Cerrate* 2658 (USM); Cusish, punta entre Chi-

quián y la Pampa de Lampas, 4300 m, *Cerrate* 2713 (USM). Carhuáz: Huascarán National Park, Quebrada Ishinca, 4700–4930 m, Smith & Buddensiek 11207 (F, MO). Recuay: Huascarán National Park, Quebrada Quenua Ragra, 4600–4700, Smith et al. 10659 (F, MO). Yungay: Cordillera Blanca, Llanganuco Valley, 16,000–16,500 ft, Bathgate 11 (F, USM); Huascarán National Park, Llanganuco sector, Quebrada Demandia, 4750–4900 m, Smith & Cautivo 10296 (F, MO, USM); Pisco Creek, Llanganuco Valley, Tothil 162 (UC). AREQUIPA. Cailloma: San Ignacio above Cailloma, 4500 m, Schmidt s.n. (F). JUNIN. Huancayo: Cordillera Huaytapallana, 4800 m, Rauh & Hirsch P1781 (NY). Yauli: Anticona Pass, 4800–4900 m, Dillon & Turner 1479 (F, USM); Morococha, Isern 2201 (F). NO EXACT LOCALITY. Ellenberg 2181 (USM).

2. ***Mniodes aretioides* (Schultz-Bip.) Cuatr., Folia Biol. Andina, 1: 3. 1954. Figure 15.**

Baccharis aretioides Schultz-Bip., Bonplandia 4: 51. 1856. TYPE: Peru, Dept. Puno, Prov. Carabaya, Agapata [Ayapata], W. Lechler 1823 (holotype, B, probably destroyed; isotypes, F, GH, G-DEL, not seen, F neg. 28502, fragment, F).

Merope aretioides (Schultz-Bip.) Wedd., Chlor. And. 1: 164. 1856.

Antennaria aretioides (Schultz-Bip.) A. Gray, Proc. Amer. Acad. Arts 5:139. 1861.

Suffrutescent subshrubs, pulvinate-cespitoso; stems foliaceous, cylindrical, 2–3 cm long, 3–4 mm in diameter (including leaves). Leaves with blades obovate to oblong, ca. 3 mm long, 1.2–2 mm wide, 1-nerved, base cuneate, apex truncate to subacute, both surfaces incano-villous, the abaxial surface

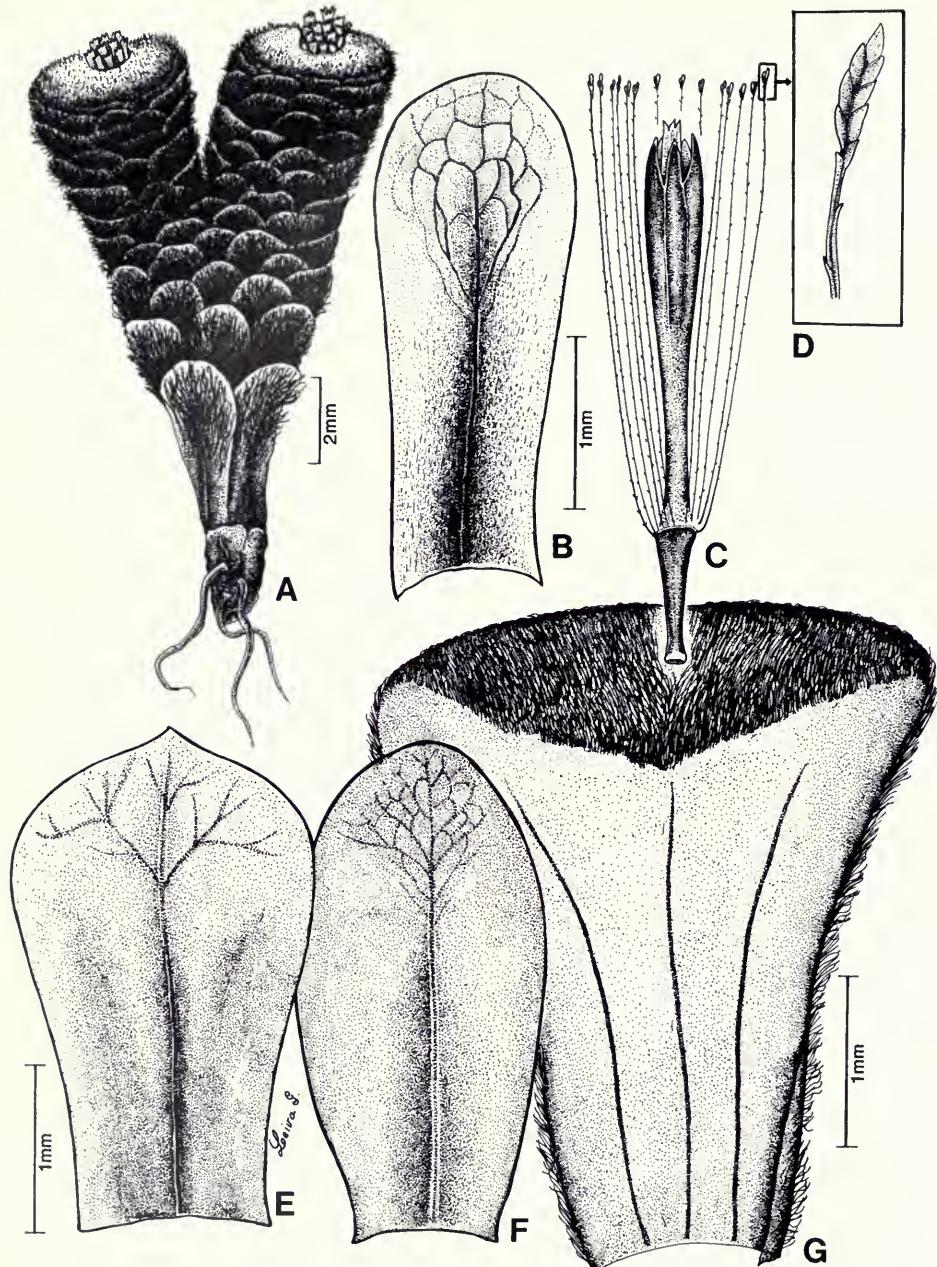


FIG. 15. *Mniodes andina*. A, habit; B, leaf with pubescence removed; C, masculine floret; D, enlargement of pappus apex, (drawn from Ellenberg 2181, USM); E, leaf of *M. aretioides* with pubescence removed; F, leaf of *M. coarctata* with pubescence removed; G, leaf of *M. pulvinulata*.

rapidly glabrescent. Capitulescences of solitary heads, terminal. Masculine capitula 3–3.5 mm high, 1–1.2 mm wide; phyllaries 8–12, oblong-linear, 3–3.5 mm long, 0.5–0.8 mm wide, subequal, apex obtuse, lacerate; florets ca. 3, the corollas ca. 2.5 mm long; pappus bristles ca. 2.5 mm

long, apex slightly dilated, acute. Feminine capitula ca. 3.5 mm high, ca. 1.5 mm wide; phyllaries 8–12, oblong-linear, 2.5–3 mm long, 0.5–1 mm wide, subequal, apex obtuse, lacerate; florets 3–5, the corollas 1.5 mm long; pappus bristles ca. 2 mm long, acute. Achenes ca. 1 mm long, glandular.

Mniodes aretioides appears to have a narrow distribution at very high elevations (ca. 4500 m) in southern Peru. It is characterized by its narrow, readily separable, cylindrical stems that are leafy for their entire length. *Mniodes aretioides* most closely resembles *M. andina* but it is readily distinguished by its glandular achenes. It is also distinguished from both *M. andina* and *M. coarctata* by its acute, slightly dilated pappus tips of the male florets.

CUZCO. Quispicanchis: Auzangate, 4500 m, Rauh & Hirsch P1142 (NY). **PUNO.** Carabaya: ca. 20 km SE of Macusani, ca. 4500 m, Dillon et al. 1083 (F, HUT, K, MO, NY, USM).

3. *Mniodes coarctata* Cuatr., Folia Biol. Andina 1: 4. 1954. TYPE: Peru, Dept. Arequipa, Prov. Arequipa, 52 mi ENE of Arequipa, 15,000 ft, 18 Apr 1952, C. B. Koford P. 25 (holotype, UC; isotype, F). **Figure 15.**

Suffruticose perennial herbs, pulvinate-cespitosose; stems foliaceous, cylindrically compressed, 2–3 cm long, 3–5 mm in diameter (including leaves). Leaves with blades ovate to elliptic, 3–3.5 mm long, ca. 2 mm wide, 1-nerved, apex obtuse to rounded, both surfaces densely villous. Capitulescences of solitary heads, terminal. Masculine capitula 3–3.5 mm high, 1–1.5 mm wide; phyllaries 7–8, oblong, 3–3.2 mm long, 0.3–1 mm wide, apex obtuse, lacerate; florets ca. 8, the corollas ca. 2.8 mm long; pappus bristles ca. 3 mm long, clavellate. Feminine capitula ca. 3 mm high, ca. 1.5 mm wide, sessile; phyllaries 7–8, oblong, ca. 2.5 mm long, ca. 0.5–0.9 mm wide, apex obtuse to rounded; florets ca. 9, the corollas ca. 1.8 mm long; pappus bristles ca. 2 mm long, acute. Achenes ca. 1 mm long, glabrous.

Mniodes coarctata is only known from a few collections from central and southern Peru. While it has been reported from northern Chile, no material from that region has been seen. It most closely resembles *M. aretioides* in general habit but is distinguished from that species by its ovate to elliptic leaves with rounded to obtuse apices.

AREQUIPA. Arequipa: Paso del Condor, 4693 m, Iltis & Urgent 1486 (GH, MO, NY, UC, USM); Volcán Pichupichu, 4500 m, Rauh & Hirsch P622 (NY). **La Unión:** Cordillerana Río Armas, 4300–4500 m, Vargas 19547 (UC). **AYACHUCO.** Parinachocas: Negro Mayo, Km 75–80, Iltis & Urgent 504 (GH, MO). **LIMA.** Huarochiri: Cañichosa, above Casapalca, 4750 m, Amstutz 114 (MO).

4. *Mniodes pulvinulata* Cuatr., Folia Biol. Andina 1: 5. 1954. TYPE: Peru, Dept. Huánuco, Rumichaca, estación 8 millas SW de Chasqui, 11,500 ft, 28 Sep 1922, J. F. Macbride & W. Featherstone 2460 (holotype, F, F neg. 49244; isotype, US). **Figure 15.**

Mniodes ferreyrae Cuatr., Folia Biol. Andina 1: 6. 1954. TYPE: Peru, Dept. Ancash, Prov. Bolognesi, Conococha, 4000 m, 8 Aug 1949, R. Ferreyra 6231 (holotype, US; isotype, USM).

Suffrutescent herbs, pulvinate-cespitosose; stems 4–8 cm long, 4–6 mm in diameter (including leaves). Leaves with blades widely obovate or fan-shaped, 3.5–4 mm long, (3)–3.5–4 mm wide, 3-nerved, base encircling the stems ca. half the circumference, apex rounded to truncate, both surfaces densely villous distally. Capitulescences of solitary heads, subterminal. Masculine capitula 5–6 mm high, 2–2.5 mm wide; phyllaries ca. 14, oblong, 3–3.5 mm long, 1–2 mm wide, subequal, scarious, apex obtuse, revolute, petaloid, white; florets 10–12, the corollas 3–3.5 mm long; pappus bristles ca. 4 mm long, clavellate. Feminine capitula 6–7 mm high, 1.5–2.5 mm wide; phyllaries 14–20, oblong, 4–6 mm long, 1–2 mm wide, subequal, apex obtuse, revolute, petaloid, white; florets 12–14, the corollas 4 mm long; pappus bristles ca. 5 mm long, acute. Achenes ca. 1.5 mm long, densely glandular.

Mniodes pulvinulata is widely distributed throughout *puna* habitats from northern to southern Peru. It is characterized by its 3-nerved, wide obovate or fan-shaped leaves encircling the stems for nearly half the circumference.

Cuatrecasas (1954) described *M. ferreyrae* as distinct from *M. pulvinulata* and stated that it had slightly narrower leaves that were less densely imbricate. After intensive study of considerable additional material, the present authors can find no basis to maintain this species. It appears that slight variations in leaf size and degree of compactness are under environmental control and a full range of leaf sizes and orientations is present in an individual gathering (*Sagástegui & Dillon 12342*) collected from the type locality.

ANCASH. Bolognesi: Cordillera Raura, 4900 m, Rauh & Hirsch P1899 (NY). **Carhuáz:** Cordillera Blanca, above Vicos on trail to Llacshacocha, at Carhua Catac, 4000 m, Hutchison & Wright 4401 (F, NY, UC); Huascarán National Park, Quebrada Ishinca, 4730–4930 m, Smith et al. 9456 (F, MO, USM), Smith & Buddensiek 11210 (F, MO). **Huaylas:** Huascarán National Park, Quebrada Santa Cruz,

4300–4800 m, *Smith et al.* 9313 (F, MO, USM). **Recuay:** Conococha, 4100 m, *Sagástegui & Dillon* 12342 (F, HUT); Huascarán National Park, Quebrada Queshque, 4550–4600 m, *Smith et al.* 11884 (F, MO, USM), 11858 (F, MO, USM). **CAJAMARCA.** Cajabamba: Cajabamba-Luchubamba, 3800 m, *Sagástegui et al.* 11154 (F, HUT, K, MO, US). **Cajamarca:** desvío al Arboretum Negritos, Km 35 de la carretera Cajamarca-Hualgayoc, 4050 m, *Sánchez et al.* 2558 (CPUN, F). **Celendín:** Pumarrume, 2730 m, *Mostacero et al.* 1098 (HUT). Otusco: Julcán, 3000 m, *sin coll.* (HUT #16935). **PUNO.** Huancané: Miajachi, 3900 m, *Aguilar s.n.* (F, USM). **LA LIBERTAD.** Huamachuco: ca. 25 km E of Quirivilca, 13,600 ft, *Duncan et al.* 2643 (F, MO, UC); Jalca de Huaguil, 3950 m, *López* 2731 (HUT), 1424 (USM); Pallar-Huaguil, carretera a Tayabamba, 3300 m, *López & Sagástegui* 8139 (GH, HUT, MO). **Santiago de Chuco:** Huillillas N of Cachicadán, 4000 m, *Stork & Horton* 10002 (F). **LIMA.** Canta: La Viuda, arriba de Culhuay, 4250 m, *Meza* 200 (F, MO, USM).

XV. Novenia

Novenia Freire, Bol. Soc. Argent. Bot. 24: 296. 1986. TYPE: *Gnaphalium tunariense* Kuntze
= *Novenia acaulis* (Benth.) Freire & Hellwig.

Acaulescent, cespitose, perennial herbs. Leaves densely rosulate, sessile; blade narrowly linear, coriaceous, canaliculate, the base slightly expanded and densely villous, apex attenuate, mucronate, both surfaces glabrous distally. Capitula 1–4 heads, glomerulate and sessile in the central rosette, rarely of a solitary head. Capitula disciform, heterogamous; phyllaries subequal, ca. 4-seriate, stramineous, scarious, glabrous, indurate; pistillate florets 3–9, the corolla filiform, briefly ligulate; hermaphroditic florets 3–6, the corollas narrowly tubular, 5-lobed. Achenes obovoid to oblong, sericeo-pubescent, brownish; pappus bristles uniseriate, the bases fused.

A monotypic genus distributed in high-elevation habitats of Peru, Bolivia, and extreme northwestern Argentina. Freire (1986a) established *Novenia* as distinct from *Lucilia* on the basis of differences in habit, foliar trichomes, and chromosome number. In fact, the characteristic $n = 9$ chromosome number was considered to be of such significance that she named the genus for the number nine and placed the genus within Merxmüller's broad "Lucilia group." The relationships of this genus are not clear but it is noteworthy that Anderberg (1989) has questioned its position even within his Gnaphalieae. We accept this genus within the Gnaphaliinae and would look to the

Brazilian genus *Chionolaena* for possible generic relationships.

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 —. AND F. HELLWIG. 1990. A new combination in *Novenia* (Compositae: Inuleae). Taxon, 39: 124–125.

1. *Novenia acaulis* (Wedd. ex Benth.) Freire & Hellwig, Taxon, 39: 125. 1990. Figure 16.

- Dolichogyne acaulis* Wedd. ex Benth., Gen. Pl. 2: 258. 1873. TYPE: Bolivia, "Prov. a Larecaja, vicinii Sorata," Mandon 221 (BM, lectotype, not seen).
Lepidophyllum acaule (Wedd. ex Benth.) Benth. & Hook. ex J. D. Hook. & A. B. Jackson, Ind. Kew 3: 58. 1894.
Gnaphalium tunariense Kuntze, Revis. Gen. Pl. 3: 155. 1898. TYPE: Bolivia, Dept. Cochabamba, Tunarigebirge, 4000–5000 m, Apr-May 1892, "besonders auf Torfmooren häufig," O. Kuntze s.n. (NY, holotype, not seen).
Lucilia tunariensis (Kuntze) K. Schumann, Just. Bot. Jahresber. 28: 378. 1898.
Mniodes tunariensis (Kuntze) Hieron. ex Weberbauer, El Mundo Vegetal de los Andes Peruanos 73: 1945.
Novenia tunariensis (Kuntze) Freire, Bol. Soc. Argent. Bot. 24: 295. 1986.

Acaulescent herbs, 1.5–4 cm in diameter, forming cushions. Leaves with blades 1.5–2.5 cm long, 0.8–1 mm wide. Capitula 9–10 mm high, 4–5 mm wide; phyllaries ca. 18, the outer ovate to lanceolate, 5–6 mm long, 1.5–2 mm wide, apex attenuate, the inner linear, 6–7(–10) mm long, 0.8–1.5 mm wide, apex acute; marginal florets (3)–7–8(–9), the corolla ca. 3.5 mm long; hermaphroditic florets 3–4(–6), the corollas ca. 4 mm long. Achenes ca. 3 mm long; pappus bristles 4–5 mm long. Chromosome number: $n = 9$ (Freire, 1986b).

Novenia acaulis is distributed from northern Peru to Bolivia and into extreme northwestern Argentina, 3100–4600 m. Its acaulescent habit and densely rosulate, apiculate, coriaceous leaves are distinctive within the Peruvian Inuleae.

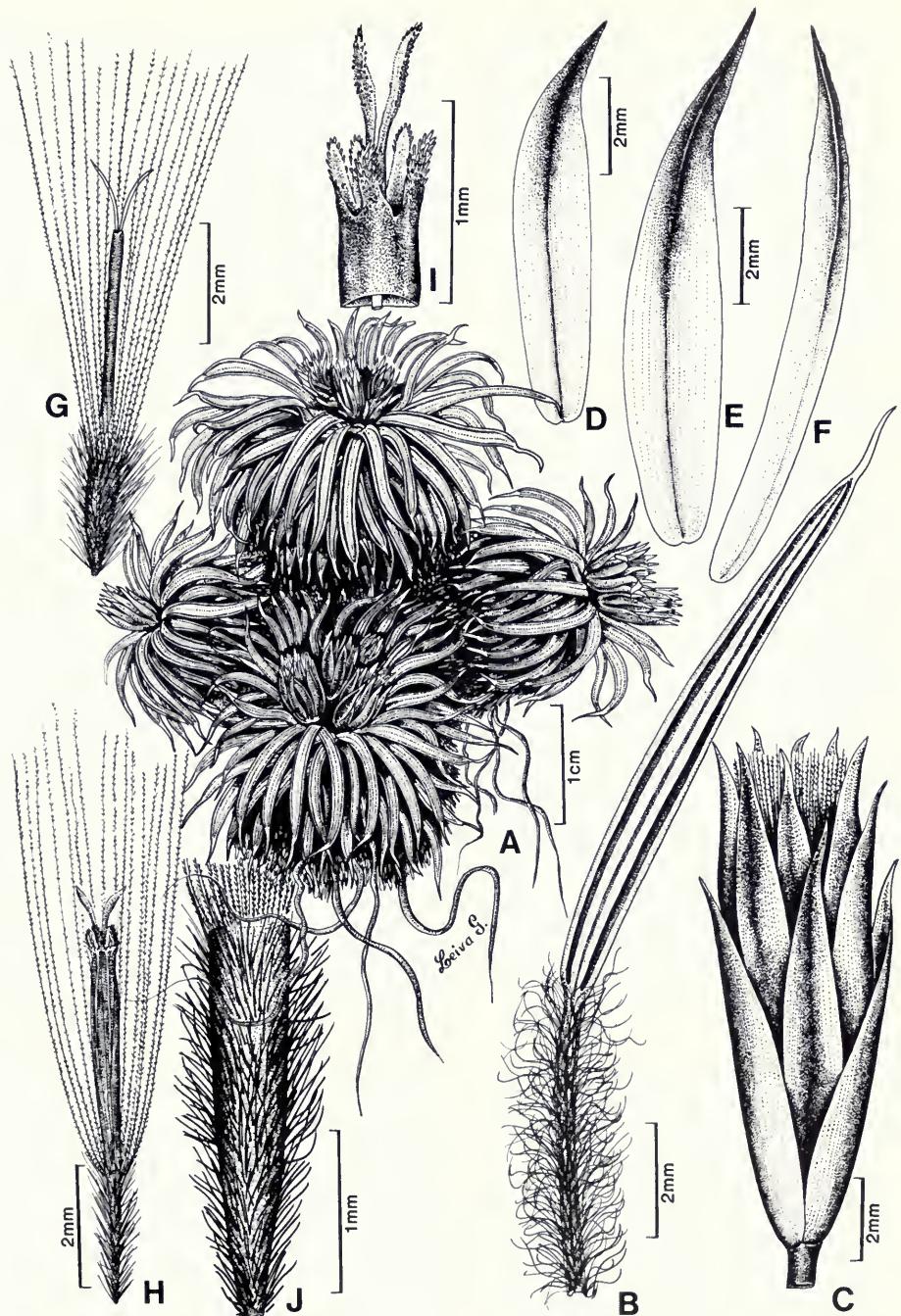


FIG. 16. *Novenia acaulis*. A, habit; B, leaf; C, capitulum; D, outer phyllary; E, center phyllary; F, inner phyllary; G, pistillate floret; H, hermaphroditic floret; I, enlargement of corolla lobes and style branches of hermaphroditic floret; J, achene. (Drawn from López & Sagástegui 8243, HUT.)

ANCASH. Carhuáz: Cordillera Blanca, above Viscos [Viscas] on trail to Llaschacocha, at Carhua Catac, 4000 m, Hutchison & Wright 4398 (UC). Huari: Huascarán National Park, 1 km below Manto Mina, 4300 m, Smith

& Buddensiek 11012 (F, MO). Recuay: Quebrada Huanca, 3950 m, Smith & Buddensiek 10971 (F, MO); Quebrada Quesque, 4550–4600 m, Smith et al. 11887 (F). **CAJAMARCA.** Contumazá: Jalca de las Quinuas (Contu-

mazá-Asunción), 3900 m, *Sagástegui et al.* 10089 (F, HUT, MO). **San Miguel:** Taulís Alto, 3100 m, *Sagástegui et al.* 9545 (F, HUT). **CUZCO.** **Canchis:** La Raya, 4400–4500 m, *Pennell* 13508 (F). **HUANUCO.** **Dos de Mayo:** Lauricocha, *Cardich s.n.* (F, MO, USM). **JUNÍN.** Junín: Junín, *Aguilar s.n.* (F, MO, USM); Yauli: near Atocsayco, ca. 4200 m, *Pearsall* 825 (F). **LA LIBERTAD.** **Patáz:** carretera Huancaspata-Tayabamba, 3700 m, *López & Sagástegui* 8243 (HUT, MO). **LIMA.** Huarochirí: laguna de Chumpicocha, 4600 m, *Cerrate* 2001 (USM). **PASCO.** **Pasco:** Huarón, ca. 14,000 ft, *Macbride & Featherstone* 1144 (F). **PUNO.** **Carabaya:** Macusani, 4300 m, *Marín* 2092 (F). **NO EXACT LOCALITY.** *Ellenberg* 654 (USM), 679 (USM); *Haenke* 1928 (F); *Weberbauer* 5452 (F).

XVI. Pluchea

Pluchea Cass., Bull. Sci. Soc. Philom. Paris 1817: 31. 1817. TYPE: *Conyza marilandica* A. Michaux ≡ *Pluchea marylandica* (A. Michaux) Cass.³

Perennial herbs or shrubs, often aromatic; stems glabrous, pubescent, or glandular, sometimes winged. Leaves alternate, simple, sessile, auriculate-clasping, or occasionally petiolate, often decurrent on stem; blade ovate to linear-lanceolate, glabrous, pubescent, or glandular, the margins entire or toothed. Capitulescences corymbose-paniculate or elongate to flat-topped, cymes. Capitula disciform, heterogamous; involucres ovoid or campanulate to hemispheric; phyllaries 2–5-seriate, imbricate, herbaceous to chartaceous, indurate, or scarious; receptacles flat, glabrous; pistillate florets multiseriate, the corollas filiform, slightly dilated distally, 3(–4)-lobed, purplish to

cream-white, the styles greatly divided, the branches slender, exserted; disc florets hermaphroditic, the corollas tubular, slender, distally dilated, cylindrical or slightly campanulate, 5-lobed, rose to rose-purple, the anther bases sagittate, caudate, the terminal appendages deltoid, rounded, the styles bifid, the branches slender, separate or united, apex rounded. Achenes cylindrical, prominently 3–6-ribbed, strigose, glandular, or glabrous; pappus bristles barbellate, uniseriate, the bases fused. Chromosome numbers: $n = 10, 15$.

Pluchea includes about 40 species occurring in the warmer regions of both hemispheres, with four species known from Peru. The generic limits have been emended by Robinson and Cuatrecasas (1973) to include several species previously placed in *Tessaria* (e.g., *P. absinthioides* and *P. zamalloae*).

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Key to Species of *Pluchea*

1. Perennial herbs usually 1 m or less tall; stems winged; leaves linear-lanceolate to obovate, generally greater than 6 cm long *P. microcephala*
1. Shrubs usually over 1 m tall; stems unwinged; leaves lanceolate, elliptic, or ovate, 1–5(–8) cm long 2
2. Leaves 5–8 cm long, usually oblanceolate, densely cano-tomentulose *P. absinthioides*
2. Leaves 1–3.7 cm long, ovate to oval or elliptic (rarely oblanceolate), tomentose to strigillose 3
 3. Spreading shrubs to 3.5 m tall; leaves oval to ovate, 8–25 mm wide; distributed in arid coast habitats from northern Peru to northern Chile (usually below 1000 m) *P. chingoyo*
 3. Erect shrubs, usually less than 2 m tall; leaves elliptic or rarely oblanceolate, 7–15 mm wide; distributed in interior southern Peru, above 1000 m *P. zamalloae*

1. *Pluchea absinthioides* (Hook. & Arn.) H. Robinson & Cuatr., *Phytologia* 27: 284. 1973.

³ For additional generic synonymy, see Godfrey (1962). Only the above name has been used for Peruvian material.

Baccharis absinthioides Hook. & Arn., Bot. Beechey Voy. p. 57. 1830. TYPE: Chile, Valparaíso, *T. Bridges* 55 (holotype, GL, not seen).
Tessaria absinthioides (Hook. & Arn.) DC., Prodr. 5: 457. 1836.

Shrubs or subshrubs to 2 m tall; stems erect, densely tomentulose. Leaves oblanceolate, 5–8 cm long, 5–12 mm wide, base attenuate to a pseudo-petiole, apex acute to subobtuse, both surfaces densely cano-tomentose, the margins dentate or rarely entire. **Capitulescences** cymose-corymbose, terminal. **Capitula** 6–8 mm high, 4–5 mm wide; involucres campanulate; phyllaries 3–4-seriate, scarious, ciliate, the outer ovate, 2.5–3 mm long, 1.2–1.5 mm wide, apex obtuse, the inner lanceolate to linear, 5–6 mm long, 0.6–1 mm wide, apex obtuse to attenuate; pistillate florets ca. 100, the corollas 5–6 mm long, lilac; hermaphroditic florets 6–14, the corollas ca. 6 mm long, the lobes 1–1.5 mm long. **Achenes** ca. 0.6 mm long, glabrous; pappus bristles 4.5–5 mm long.

Pluchea absinthioides occurs frequently in sandy soils from southern Peru, Bolivia, Chile, Uruguay, and Argentina. In Peru, it is known from two collections in the Department of Arequipa (2100–2300 m) where it is known by the following common names: *brea*, *pájaro bobo*, *suncho negro*.

AREQUIPA. Arequipa: southern slopes of Chachani, 2287 m, Hinkley 33 (F, GH, US); Tiabaya, 2100–2200 m, Pennell 13084 (GH).

2. *Pluchea chingoyo* (Kunth) DC., Prodr. 5: 452. 1836. Figure 17.

Conyzia chingoyo Kunth, Nov. Gen. Sp. (fol.) 4: 59. 1820. TYPE: Peru, Dept. Ancash, Prov. Santa, A. Bonpland 3758 (holotype, P, not seen, IDC Microfiche 6209. 96: I. 5, F neg. 37652, fragment, F).

Shrubs to 3.5 m tall; stems densely branched, spreading, glandular-pubescent. Leaves sessile or with petiolates to 1 cm long; blade ovate to oval, 1–3(–3.5) cm long, 8–25 mm wide, upper surfaces glabrous to sparsely tomentose, lower surfaces glabrous to densely tomentose, both surfaces glandular-punctate, base cuneate to truncate or cordate, apex rounded to obtuse, the margins entire to serrate. **Capitulescences** densely corymbose-paniculate, terminal and axillary; peduncles 1–5 mm long, puberulent. **Capitula** 4–5 mm high, 2.5–3 mm wide; involucres campanulate; phyllaries 4–5-seriate, the outer ovate to lanceolate, 1–1.5 mm long, 0.5–0.7 mm wide, glandular, resinous, apex acute, ciliolate, the inner linear to lanceolate, 3.5–4.5 mm long, 0.3–0.5 mm wide, apex attenuate, glandular, resinous; pistillate florets ca. 100, the



FIG. 17. Flowering branch of *Pluchea chingoyo*. (Drawn from Ferrryea 6298, F.)

corollas 2.5–3 mm long, 3-fid, the style branches linear, ca. 0.5 mm long; hermaphroditic florets ca. 15, the corollas 4.2–4.7 mm long, the limb slightly expanded, 5-lobed, the lobes ca. 0.5 mm long, deltate, the style branches ca. 0.5 mm long, strigillose below the point of bifurcation. **Achenes** ca. 0.6 mm long, hirtellous; pappus bristles 1.5–3 mm long. Chromosome number: $n = 10$ (Sundberg & Dillon, 1986).

Pluchea chingoyo occurs in xeric, coastal habitats (10–800 m) from northern Peru to northern Chile; occasional individuals are found at higher elevations further inland. This species is quite distinctive in having densely branched, shrubby habit and small ovate leaves. In Peru, populations in the north (Department of Piura) have considerably more pubescence than those in the south (Departments of Ica and Arequipa), possibly due to environmental effects.

It is known by the following common names: *parrano*, *toñuz*.

ANCASH. Bolognesi: abajo de Raquis, ruta Pativilca-Huaráz, 1900 m, Sagástegui et al. 12298 (F, HUT). **CASMA:** ca. 48 km N of Pativilca on Pan American Hwy., ca. 10 m, Dillon & Whalen 4006 (F, USM); Yautan, 2000 ft, Macbride & Featherstone 2562 (GH, US). **Bolognesi:**

abajo de Raquía, ruta a Pativilca-Huaráz, 1900 m, *Sagástegui et al.* 12298 (F, HUT). **Santa:** Samanco, cerca a Chimbote, 10–15 m, *Ferreyra* 18529 (F, MO, USM). **AR-EQUIPA. Camaná:** 25 km NW of Camaná, *Illes et al.* 1557 (MO, us). **Caravelí:** Lomas de Jahuay, entre Chala y Nazca, 300–400 m, *Ferreyra* 14010 (MO, USM). **Isla:** 14 km S of Mollendo, *Hutchison & Wright* 7138 (F, US, USM); 7 km de Matarani, 500 m, *López* 64 (MO); Mollendo, 600 ft, *Stafford* 902 (F). **ICA. Ica:** laguna de La Victoria, 500 m, *Ferreyra* 565 (F, MO, USM); Hda. Ocuaje, 300–400 m, *Ferreyra* 1381 (UC, US, USM); Laguna de Orovilca, a 6–7 km de Ica, 400 m, *Cerrate* 897 (MO, USM), *Ferrerya* 2496 (MO, NY, US), 6277 (MO, US, USM); Huaga, 300 m, *Ferreyra* 8205 (MO, USM); Ica, *Ridoutt s.n.* (MO, USM 11308); Ica-Ocuaje, 300 m, *Weberbauer* 7194 (GH, US). **Nazca:** ca. 85 km S of Nazca, 90 m, *Ellenberg* 4143 (us). **Pisco:** Chincha, valley of Rio San Pisco, 900–1000 m, *Weberbauer* 5369 (F, GH, US). **JUNÍN. Tarma:** cerca Fundo Puguo, 800–900 m, *Ferreyra* 17702 (MO, USM). **LA LIBERTAD. Pascoasmayo:** 7 km E of San Pedro de Lloc, ca. 120 m, *Dillon & Whalen* 4020 (F, MO, NY, TEX, USM). **Trujillo:** between Virú and Chimbote, 485 km N of Lima on Pan-Amer Hwy, *Rahn* 323 (MO). **LAMBAYEQUE. Chiclayo:** ca. 2 km E of Zaña, 100–150 m, *Dillon et al.* 4095 (F, MO, TEX, USM); 28 km S of Lambayeque, 30 m, *Ellenberg* 3749 (us); desvío a Oyotun, cerca a Bebedero, 200 m, *Sagástegui et al.* 12352 (F, HUT, K, MO); Chiclayo-Patapo, 50 m, *West* 3580 (GH, UC). **Ferreñafe:** Pitipo (tres Tomas), 80 m, *Llatas & Laos* 822 (F). **LIMA. Cañete:** Chilca, *Asplund* 13849 (us). **Huarchirí:** Cocachacra, Km 60 entre Lima y La Oroyo, *Ridoutt s.n.* (MO, USM 126399). **Lima:** Chosica, 40 km de Lima, 800 m, *Ferreyra* 546 (MO, USM); La Cantuta, cerca Chosica, Lima-Huancayo, 700–800 m, *Ferreyra* 6298 (F, US, USM); ruinas de Cajamarquilla, 300–400 m, *Ferreyra* 2847 (MO, USM), 16886 (MO, USM); Ricardo Palma, 850 m, *Riccio* 4677 (us). Hda. Zárate, *Soukup* 3133 (us). **PIURA. Huancabamba:** arriba de Palambia, 1500–1600 m, *Cerrate & Tovar* 10809 (MO, USM). **Morropón:** road to Huancabamba, 3 km W of Serran, 12 km E of Malacasi, 200 m, *Hutchison & Wright* 6548 (F, GH, MO, NY, UC, US). **Talara:** 25 mi E of Cabo Blanco, Caña Dulce, *Haught* 200 (F, GH, NY). **TACNA. Tacna:** Boca del Río, 50 m, *Zegarra* 3344 (us).

3. Pluchea microcephala Godfrey, Jour. Elisha Mitchell Soc. 68: 270. 1952. TYPE: Argentina, Prov. Formosa, Dept. Pirane, al N.O. a 6 km Pirane, 5 Dec 1945, *T. Morel* 518 (holotype, F; isotype, LIL, not seen). **Figure 18.**

Perennial herbs to 1.2 m tall; stems erect, branched, glabrous to glandular-pubescent, leafy, alate, the wings 1.5–5 mm wide. Leaves sessile; blade narrowly obovate, elliptic, or linear-lanceolate, 6–9(–11) cm long, 1–3(–4) cm wide, upper and lower surfaces glandular pubescent to glabrous, base attenuate, decurrent on stems, apex acute to obtuse, the margins serrate. Capitulescences densely cymose-paniculate, 50–75-headed; peduncles glandular pubescent. Capitula (3)–4–5(–

6) mm high, 2–3.5(–4) mm wide; involucres narrowly campanulate; phyllaries 4–5-seriate, glabrous, the outer ovate, 1.5–2 mm long, 0.9–1.2 mm wide, submembranous, apex obtuse, the inner oblong to linear-lanceolate, 3.5–4.5 mm long, 0.4–0.7 mm wide, membranous, apex acute to attenuate; pistillate florets 25–50, the corollas ca. 4–4.3 mm long, 3-dentate, rose-purple; hermaphroditic florets 3–5, the corollas 4.5–5.5 mm long, apex dilated, 5-lobed, the lobes lanceolate, ca. 0.5 mm long. Achenes 0.8–1 mm long, papillose to glabrous, 4–6-ribbed; pappus bristles, 4–4.5 mm long. Chromosome number: *n* = 10 (Sundberg & Dillon, 1986).

Pluchea microcephala is known from eastern Bolivia, northern Argentina, and northeastern Peru (0–200 m). It is perhaps most closely related to *P. suaveolens* of Argentina, which shares its winged stems and leaves, but *P. microcephala* is distinguished by its smaller capitula with narrowly campanulate involucres.

LA LIBERTAD. Pacasmayo: Río Jequetepeque, *Sagástegui et al.* 8530 (F, HUT, MO); Chepén-Pacanguilla, 180 m, *Sagástegui & Diestra* 11486 (F, HUT, K). **LAMBAYEQUE. Chiclayo:** ca. 2 km E of Zaña, 100–150 m, *Dillon et al.* 4094 (CPUN, F, GH, HUT, K, MO, NY, TEX, US, USM); ca. 2.5 km E of Chiclayo, *Hudson* 965 (F, MO); Chiclayo-Lambayeque, Km 764, *López* 8108 (F), *Sagástegui* 8353 (F, HUT, MO); common in plains around Chiclayo, *Stork* 11429 (F, UC).

4. *Pluchea zamalloae* (Cabr.) H. Robinson & Cuatr., Phytologia 27: 284. 1973.

Tessaria zamalloae Cabr., Notas Mus. La Plata, Bot. 19: 201. 1959. TYPE: Peru, Dept. Cuzco, Prov. Urubamba, 3870 m, *H. Zamalloa* 1007 (holotype, LP, not seen).

Shrubs to 3 m; stems densely villous to glabrescent, striate. Leaves sessile or with petioles 1–2 mm long; blade elliptic to oblanceolate, 1.5–3.7 cm long, 7–15 mm wide, upper surfaces sparsely strigillose, glandular-punctate, resinous, lower surfaces strigillose, glandular-punctate, resinous, base attenuate, apex obtuse, the margins entire or dentate with 6–8 pairs of teeth. Capitulescences dense corymbose cymes, terminal; peduncles 3–5 mm long, puberulent. Capitula 4–5 mm high, 2.5–3 mm wide; involucres campanulate; phyllaries 4–5-seriate, the outer ovate to oblong, 1–2 mm long, ca. 0.6 mm wide, apex obtuse, the inner lanceolate to oblong-lanceolate, 3.5–4 mm long, apex acute

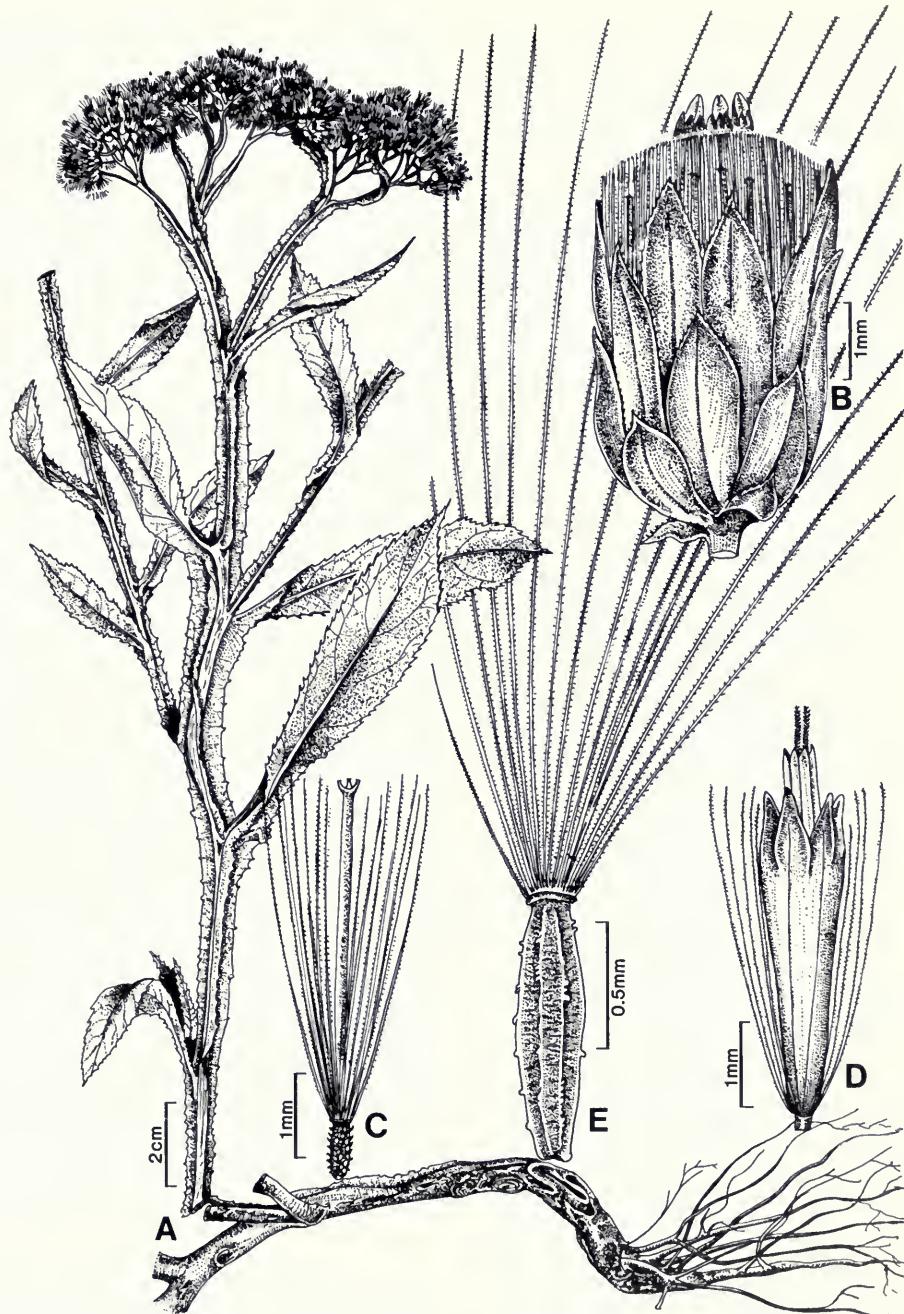


FIG. 18. *Pluchea microcephala*. A, habit; B, capitulum; C, pistillate floret; D, hermaphroditic floret; E, achene with pappus. (Drawn from Sagástegui et al. 8530, HUT.)

to attenuate; pistillate florets ca. 20, the corollas ca. 3 mm long, 3–4-fid, the style branches ca. 0.5 mm long; hermaphroditic florets ca. 4, the corollas 4–5 mm long, the limb slightly expanded, 5-lobed,

the teeth triangular, ca. 0.5 mm long, the style branches ca. 0.5 mm long, strigillose below the point of bifurcation. Achenes 0.6–0.8 mm long, sericeous; pappus bristles 2.5–3.5 mm long.

Pluchea zamalloae is apparently a rare species that occurs in dry sites along river valleys in southern Peru (1850–3300 m). This species is most closely related to *P. chingoyo* but is readily distinguished from the latter by its leaf-shape and ecological preference.

APURÍMAC. Abancay: cerca de Cunyac, 2300 m, Ferreyra 9829 (F, MO, US, USM); 33 km SW of Abancay, Hac. Casinchihua, 2300–2500 m, Iltis & Ugent 814 (WIS, US), 814a (WIS); Quebrada Honda, Vargas 465 (US); E side of Río Pacachacas, 1850 m, West 3795 (MO, UC). **AYACUCHO. Huanta:** Hda. Bado Grande, 2300 m, Vargas 15670 (US). **CUZCO. Anta:** cerca de Yucay, 3300 m, Ferreyra 9875 (MO, USM).

XVII. Pterocaulon

Pterocaulon Elliott, Sketch Bot. S. Carol. 2: 323. 1823. TYPE: *Conyzia pycnostachya* A. Michaux ≡ *Pterocaulon pycnostachyum* (A. Michaux) Elliott.

Perennial herbs, often suffruticose, glabrous or tomentose. Leaves alternate, sessile, decurrent on alate stems, the margins entire or dentate. Capitulescences glomerate or spicate. Capitula disciform, heterogamous, sessile; involucres campanulate; phyllaries imbricate, linear-lanceolate, scarious, caducous; receptacles hirsute or glabrous; pistillate florets multiseriate, the corollas filiform, truncate or 2–3-dentate, the styles of pistillate florets bifid, filiform, glabrous; disc florets hermaphroditic or functionally staminate, the corollas narrowly tubular, the limb 5-lobed, the anther bases sagittate, the terminal appendages ovate-lanceolate, rounded, the styles of hermaphroditic florets bifid, pubescent distally. Achenes cylindrical to fusiform, angled or compressed, costate; pappus bristles 1–2-seriate. Chromosome number: $n = 10$. (Coleman, 1968).

Pterocaulon contains 25–30 species in North and South America, Madagascar, Mauritius, Asia, and Australia. Some 12 species occur in South America, with only the following species represented in Peru.

References

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COLEMAN, R. 1968. Chromosome numbers in some Brazilian Compositae. Rhodora, 70: 95–102.

1. *Pterocaulon alopecuroides* (Lam.) DC.⁴, Prodr. 5: 454. 1836. Figure 19.

Conyzia alopecuroides Lam., Encycl. 2: 93. 1786. TYPE: Martinique, "on trouve cette plante à la Martinique, dans les prés qu'on nomme Savannes. M. Commerson l'a observée au Brasil," collector unknown (holotype, P, not seen).

Perennial herbs to 1.5 m tall, suffruticose; stems erect, branched above, tomentose, alate, the wings entire, discolored, 2–3 mm wide. Leaves sessile, decurrent; blade obovate-lanceolate to elliptic, 5–7 cm long, 2–3 cm wide, discolored, upper surfaces glabrescent, lower surfaces lanuginous, the margins denticulate. Capitulescences spicate, terminal, 3–17 cm long, compact, frequently interrupted at the base. Capitula 5–8 mm high, ca. 3 mm wide; involucres campanulate; outer phyllaries oblong-lanceolate, 2–3 mm long, ca. 0.5 mm wide, lanulose, apiculate, the inner phyllaries narrowly lanceolate, 4–6 mm long, 0.3–0.5 mm wide, ciliolate, acuminate; pistillate florets 25–50, the corollas 4–5 mm long; hermaphroditic florets 1–2, the corollas ca. 4 mm long. Achenes ca. 3 mm long, pilose, glandular; pappus bristles ca. 5 mm long, white. Chromosome number: $n = 10$ (Coleman, 1968).

Pterocaulon alopecuroides is a widely distributed species ranging from the Caribbean Antilles to southern South America, including Brazil, Peru, Bolivia, Paraguay, Uruguay, and northern Argentina. In Peru, it is found on the eastern slope of the Andes at elevations below 1200 m.

JUNÍN. Tarma: Chanchamayo Valley, 1200 m, Schunke 1533 (F). **SAN MARTÍN. San Martín:** Tarapoto, 1855, Spruce 4488 (F, GH, NY); Tarapoto, 840 m, Woytkowski 35101 (F, MO).

XVIII. Stuckertiella

Stuckertiella Beauverd, Bull. Soc. Bot. Genève, ser. 2, 5: 205. 1913. TYPE: *Gamochaeta capitata* Wedd. ≡ *Stuckertiella capitata* (Wedd.) Beauverd.

⁴ For complete synonymy, see Cabrera and Ragonese (1978).

Annual to perennial **herbs**, branched, prostrate to ascending. **Leaves** alternate, the margins entire. **Capitulescences** glomerate, terminal, subtended by upper leaves. **Capitula** disciform, sessile; involucres hemispherical to campanulate; phyllaries 3–4-seriate, imbricate, scarious; receptacles plane, alveolate; pistillate florets multiseriate, the corollas filiform, irregularly lobed; disc florets hermaphroditic, 4–5, functionally staminate, the corollas tubular, 4-lobed, the anthers 4, base sagittate, caudate, 3 with short, obtuse apical appendages, 1 longer, lanceolate, the style branches truncate. **Achenes** fusiform to obovoid, surface with sinuate-reticulate sculpturing, glandular with bicelled, sessile papillae or trichomes, mucilaginous when wet; pappus bristles scabrid, barbellate, apex blunt, base fused, deciduous together as a unit, white.

A genus of two species confined to South America: *Stuckertiella capitata* (Wedd.) Beauverd from Peru, Bolivia, and northern Argentina and *S. perigrina* Beauverd from central Argentina.

Reference

BEAUVERD, G. 1913. Le genre *Stuckertiella* Beauverd, gen. nov. Bull. Soc. Bot. Genève, ser. 2, 5: 205–209.

1. ***Stuckertiella capitata* (Wedd.) Beauverd**, Bull. Soc. Bot. Genève, ser. 2, 5: 206. 1913. **Figure 20.**

Gamochaeta capitata Wedd., Chlor. And. 1: 153. 1855.
TYPE: Peru, Dept. Cuzco, C. Gay s.n. (holotype, P, not seen, F neg. 37584, fragment, F).

Gnaphalium capitatum (Wedd.) Griseb., Abh. Königl. Ges. Wiss. Göttingen, 24: 186. 1879. Non Lamark (1786), nec Thunberg (1799).

Gnaphalium weddellianum Rusby, Mem. Torrey Bot. Club 3: 57. 1893 (*nomen novum* for *Gnaphalium capitatum* (Wedd.) Griseb.).

Annual to perennial **herbs**, to 25 cm tall; stems usually prostrate, arachnoid-lanate, branched. **Leaves** linear-lanceolate, 5–30 mm long, 1–2 mm wide, sessile, apex acute, both surfaces arachnoid-lanate, or glabrescent below. **Capitulescences** glomerate at tips of branchlets, overtopped by terminal leaves. **Capitula** 4–5 mm high, 4–5 mm wide; involucres campanulate; outer phyllaries ovate, ca. 2.5 mm long, ca. 1.5 mm wide, base woolly, apex obtuse to rounded, the margins scarious, the inner lanceolate to oblong-lanceolate, ca. 3 mm long, ca.



FIG. 19. Flowering stem of *Pterocaulon alopecuroides*. (Drawn from Woytkowski 35101, MO.)

1 mm wide, apex rounded, scarious; marginal florets pistillate, 50–75, the corollas ca. 2 mm long; hermaphroditic florets 4–5, the corollas 2–2.5 mm long, 4-merous. **Achenes** obovoid, 0.4–0.5 mm long; pappus bristles ca. 2.5 mm long.

Stuckertiella capitata is distributed from northern Peru to northwestern Argentina, 2000–4000 m. In Peru, it occupies moist habitats between 3000–4000 m. This species is readily distinguished by its capitula, which are subtended by upper leaves, and by its 4-merous hermaphroditic florets.

ANCASH. Carhuáz: Cordillera Blanca, valley of Río Marcará, Viscos [Viscas], 2960 m, Hutchison & Wright 4291 (us). Huaylas: Huascarán National Park, Quebrada

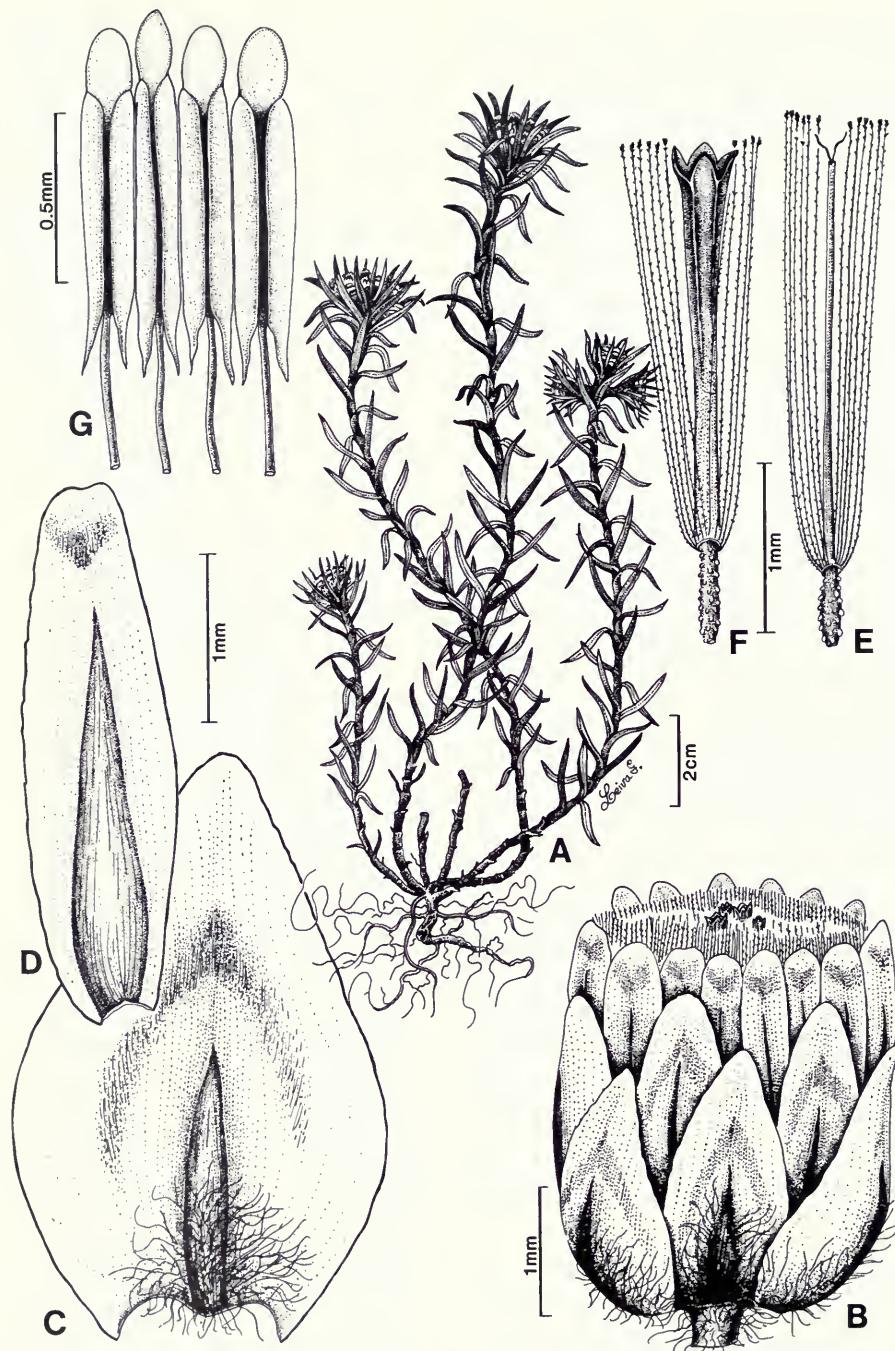


FIG. 20. *Stuckertiella capitata*. A, habit; B, capitulum; C, outer phyllary; D, inner phyllary; E, pistillate floret; F, hermaphroditic floret; G, anthers. (Drawn from Sagástegui et al. 8993, HUT.)

Alpamayo, 4020–4250 m, Smith et al. 9828. Yungay: ca. 25 km NE of Yungay, slopes below Laguna de Llanganuco, 3380 m, Dillon et al. 3115 (F, MO, USM); Yungay-Llanganuco, 3950 m, López et al. 7442 (HUT). APURÍMAC. Abancay: Sayhuite, Km 45 E of Abancay, 3600

m; Hutchison 1737 (F, US); Ampay, 3500 m, Vargas & Santander 510 (F, MO), 513 (F). AYACUCHO. Prov. Unknown: near Mataral, 3600 m, West 3670 (GH, MO). CAJAMARCA. Contumazá: Portachuelo de Nanrá (Venatrón-Totorillas), 3350 m, Sagástegui et al. 8993 (F,

HUT, MO). CUZCO. Canas: Langui, 4000 m, Chávez 2324 (MO). Paucartambo: Hacienda Churu, 3500 m, Herrera 1049 (F, GH), 1399 (US). HUÁNUCO. Huánuco: Pampayacu, Sawada 95 (F). JUNIN. Huancayo: Quebrada Occopilla, Soukup 3631 (F); Yauli: Laguna de Pomacocha, 4100 m, Ochoa 1991 (us). LIMA. Huarocharí: Chicla, 3700 m, Asplund 11318 (us); Ticlio-Pap, 4800 m, Rauh & Hirsch P84 (NY). PASCO. Pasco: Km 5 Cerro de Pasco-Huánuco, 4125 m, Ellenberg 4130 (us). PUNO. Huancané: Mijachí, Isla Chirone, 3900 m, Ortiz s.n. (USM); Lampa: 9 km SW of Santa Lucia, 4000 m, Iltis & Ugent 1426 (us); Melgar: Orurillo, Soukup 504 (F), 10317 (MO).

XIX. *Tessaria*

Tessaria Ruiz & Pavón, Fl. Peruv. Prodr. 112, t. 24. 1794. TYPE: *T. integrifolia* Ruiz & Pavón.

Trees or large shrubs; roots giving rise to adventitious stems. Leaves alternate, the margins entire or rarely dentate. Capitulescences cymose-paniculate. Capitula disciform, short pedunculate; involucres turbinate; phyllaries 3–5-seriate, imbricate, scarious, glabrous; receptacles conical, alveolate, pubescent; marginal florets pistillate, the corollas filiform, 2–3-fid; disc floret hermaphroditic, functionally staminate, solitary, the corolla tubular, the limb 5-lobed, the anther bases sagittate, caudate, the terminal appendages narrowly ovate, the style unbranched, scabrous. Achenes cylindrical, glabrous; pappus bristles scabrid, barbellate, uniseriate, base fused, deciduous together as a unit, white.

A monotypic genus as circumscribed by Robinson and Cuatrecasas (1973). They transferred several species traditionally placed in *Tessaria* to *Pluchea* (see discussion under that genus).

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 CABRERA, A. L. 1939. Las especies Argentinas del género *Tessaria*. Lilloa, 4: 181–189.
 ROBINSON, H., AND J. CUATRECASAS. 1973. The generic limits of *Pluchea* and *Tessaria* (Inuleae, Asteraceae). Phytologia, 27: 277–285.
 WAISMAN, C. E., E. ROZENBLUM, AND J. H. HUNZIKER. 1984. Estudios cariologicos en Compositae. I. Darwiniana, 25: 217–226.

1. *Tessaria integrifolia* Ruiz & Pavón, Syst. Veg. Fl. Peruv. Chil. 213. 1798. TYPE: Peru [exact locality unknown], *H. Ruiz & J. Pavón* 30/26 (holotype, MA, not seen; isotype, F, F neg. 49304). **Figure 21.**

Tessaria dentata Ruiz & Pavón, Syst. Veg. Fl. Peruv. Chil. 214. 1798. TYPE: Peru, Dept. Lima, Prov. Chancay, Chancay, *H. Ruiz & J. Pavón* 30/25 (holotype, MA, not seen, F neg. 29309; isotype, F).

Trees or large shrubs, 3–10(–15) m tall; stems green to brownish green. Leaves oblanceolate to lanceolate or elliptic, 3–9 cm long, 0.8–3.5 cm wide, base attenuate, apex acute, mucronulate, both surfaces minutely puberulent, glandular, grayish. Capitula 4–5 mm high, 3–3.5 mm wide; outer phyllaries ovate, 1.5–2.5 mm long, 1–1.2 mm wide, apex acute, the inner linear to lanceolate, 4–5 mm long, 0.5–1 mm wide, apex reflexed; marginal florets 40–80, corollas 3–3.5 mm long, styles exserted; hermaphroditic floret 1, the corolla ca. 4 mm long. Achenes 0.5–0.8 mm long; pappus bristles ca. 20, ca. 5 mm long. Chromosome number: $n =$ ca. 10 (Waisman et al. 1984).

Tessaria integrifolia is widely distributed throughout southern Central and South America. It generally prefers sandy soils along the margins of rivers, and at times forms pure stands from adventitious root sprouts.

Leaves of this species are used medicinally for hepatitis and as a diuretic, its wood is often used in the construction of corrals, and its bark is said to be used in the tanning of leather. In Argentina, its wood is utilized in the production of paper (A. L. Cabrera, pers. comm.), and around Iquitos, Peru, it is an important forage source for cattle (F. Ayala, pers. comm.).

In Peru, it is known by the common names *bobo*, *chamchi*, and *mayu-chamchi*, in Argentina as *pájaro bobo* or *aliso*, and in Colombia as *aliso*, *cenizo*, *sauce de playa*, *olivo*, and *sauce playero*.

AMAZONAS. Bagua: between Bagua and Nazareth, 430 m, Croat 58344 (F, MO); trail from La Peca into Serranía de Bagua, 1000–1400 m, Gentry et al. 23081 (F, HUT, MO, USM); 1 km de bajo La Poza, 180 m, *Huashikat* 44 (F, MO); rain forest along Río Santiago 3–5 km above mouth, 250–300 m, Wurdack 2227 (F, GH, NY, US). ANCASH. Carhuáz: Yungay–Marcará, 2400 m, Sagástegui et al. 12327 (F, HUT, TEX). Santa: Río Santa floodplain, 2 km N of Santa, 5 m, Stork & Horton 9153 (GH). Yungay: Mancos–Yungay, Smith & Bas 4939 (F, US, USM). APURÍMAC. Abancay: Abancay, 2400 m,



FIG. 21. *Tessaria integrifolia*. A, flowering branch; B, capitulum; C, pistillate floret; D, hermaphroditic floret. (Drawn from Ridoutt 44a, HUT.)

Vargas 468 (F); Hacienda Matara, edge of Río Matara, 2200 m, Vargas 9806 (F). AREQUIPA. Arequipa: Río Yarabamba, 2800–2900 m, Arenas 53 (USM); Tingo, ca. 7500 ft, Munz 15491 (F). CAMANÁ: Río Ocoña at Ocoña, 4 m, Iltis et al. 1553 (MO, US). CAJAMARCA. Chota: Carhuaquero, entre Chongayape y Llama, 500 m, Fer-

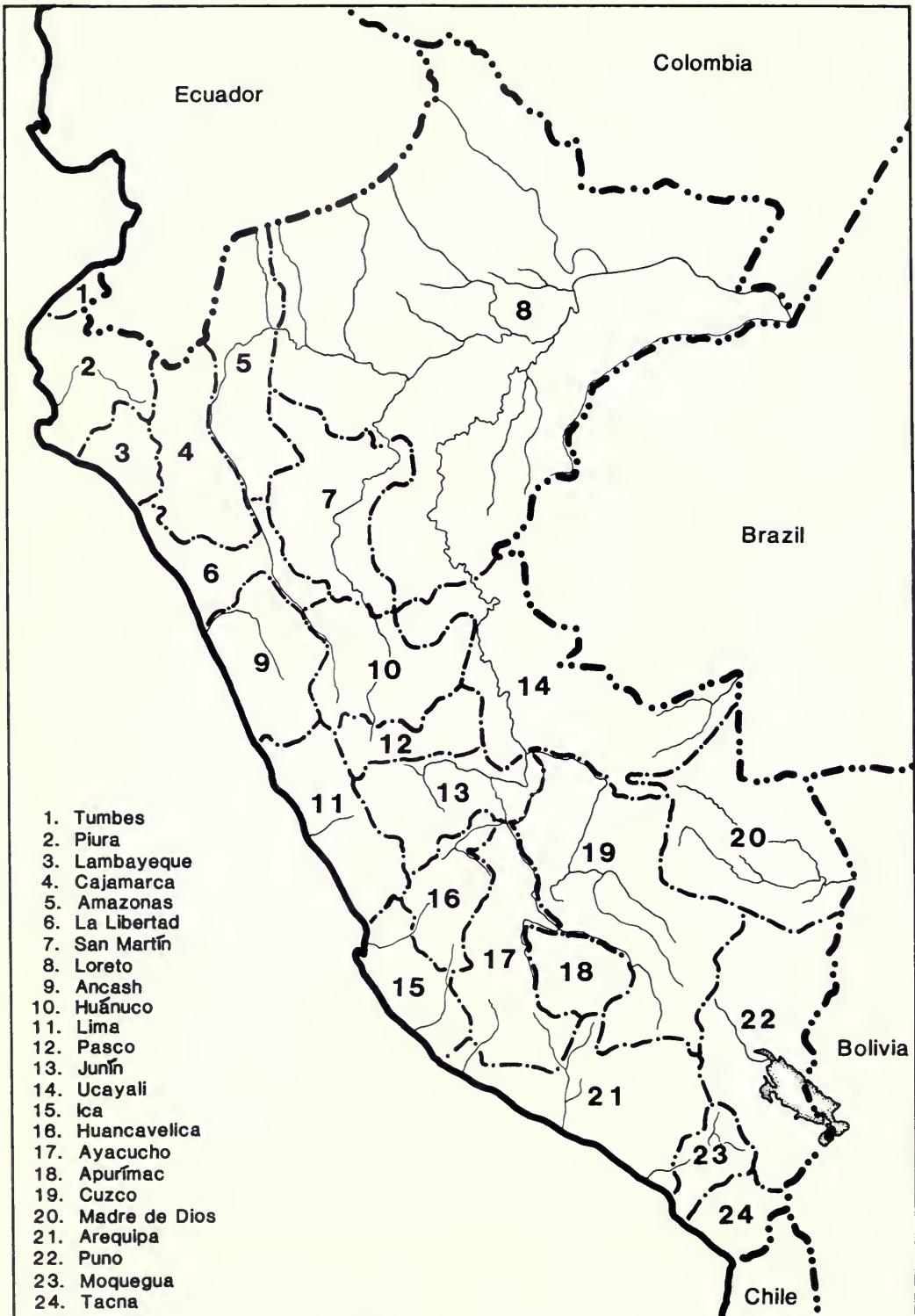
reyra 3165 (MO, USM). Jaen: Jaen, 500 m, Woytkowski 5585 (GH, MO, US). CUZCO. La Convención: ca. 5 km N of Aguas Calientes, 2000 m, Solomon 3178 (MO); Machu Picchu, 2000 m, Stork et al. 10490 (F), Vargas 823 (F, MO). Urubamba: San Miguel, ca. 1800 m, Cook & Gilbert 970 (GH, US). HUANCABELICA. Angaraes: 4 km W of

Huanta, 2000 m, *Stork & Horton* 10806 (F, GH). **HUÁNUCO.** Huánuco: downriver from Tingo María, 7000 ft, *Belshaw* 3094 (F, GH, MO, NY, US); Huánuco, ca. 7000 ft, *Macbride* 3231 (F, GH, US). **Leoncio Prado:** La Divisoria, ca. 18 km NNE of Tingo María on road to Pucallpa, 1500–1600 m, *Dillon* 2647 (F, MO, USM), *Gentry et al.* 18845 (MO, USM), *Plowman & Schunke* 11705 (F, USM). **JUNÍN.** Tarma: La Merced, *Acosta* 19 (MO, USM), La Merced, 700 m, *Killip & Smith* 23466 (GH, NY, US), 23690 (NY, US); Río Perené, 2300 ft, *Townsend* 765 (F). **LA LIBERTAD:** Pascasmayo: Pascasmayo, *Fosberg* 27995 (F, NY, US), *Rose & Rose* 18524 (NY), *Williams* 2910 (NY). Trujillo: Trujillo, near sea level, *Killip & Smith* 21503 (GH, NY, US). **LAMBAYEQUE:** Lambayeque: E side of Chiclayo, *Hudson* 938 (MO); road to Jaén, Km 17 E of Olmos, at the Bridge of Silence, 570 m, *Hutchison & Wright* 4423 (F, GH, MO, NY, US). **LIMA.** Callao: San Lorenzo, *Andersson s.n.* (F, GH, US). Chancay: Chancay, *Ridoutt* s.n. (MO, USM 12196); Pativilca, *Ridoutt* s.n. (MO, USM 13946); Estanque Lampay, Hda. Paramonga, *Ridoutt* s.n. (MO, USM 13999). Lima: Lima, *Ball* 176 (GH); between Lima and Callao, *Cook & Gilbert* 2095 (US); Hacienda Villa, ca. 20 km S of Lima, 100–120 m, *Ferreira* 6133 (MO, USM); Chosica, ca. 3000 ft, *Macbride & Featherstone* 518 (F, GH), *Holway & Holway* 778 (GH); ca. 12 km SW of Matucana, ca. 5800 ft, *King & Collins* 9002 (F, US); Lima, Bajada de Miraflores, along Malecón, 100 m, *Plowman* 11015 (F, USM); Santarrositas, *Ridoutt* s.n. (MO, USM 10276); Lima, *Soukup* 1921 (US), 2054 (F); Barranco, 50 m, *Weberbauer* 7224 (F, GH, US). **LORETO:** Alto Amazonas: Quebrada Shanuce above Yurimaguas, *Croat* 19775 (F, MO); entre Andoas y Capahuari Sur, 210 m, *Díaz & Jaramillo* 1371 (F, MO, USM); Andoas, Río Pastaza near Ecuador border, 210 m, *Gentry et al.* 29725 (F, MO, USM); Balsapuerto, 220 m, *Klug* 2999 (F, GH, MO, NY, US); Maucallacta, Río Parapanapura, 200 m, *Klug* 3940 (F, GH, MO, NY, US). **Maynas:** Lupuna, 100 m, *Ayala* 528 (MO); Dtto. Iquitos, Isla de Escabino near Santa María de Nanay, *McDaniel & Rimachi* 17324 (F, NY); Padre Isla, *McDaniel & Rimachi* 22297 (F); Río Amazonas, Isla Rondiña, opposite Leticia, *Plowman et al.* 6384 (ECON, F); Quebrada del caserío de Bombonaje Yanayacu, *Rimachi* 2567 (F), 2652 (F); lower Río Nanay, *Williams* 494 (F, GH, US); Pebas, *Williams* 1863 (F, GH, US); Iquitos, 120 m, *Williams* 8024 (F). **MADRE DE DIOS.** Tam-

bopata: ca. 3 air km or 70–80 river km SSW Puerto Maldonado, ca. 260 m, *Barbour* 5174 (F, MO, USM). **PASCO.** Oxapampa: Huancabamba, 1830 m, *Smith et al.* 1665 (F, MO). **PIURA.** Piura: Piura, *Townsend* 1399 (US). **Talara:** Parins Valley, *Haught* 146 (NY, US). **SAN MARTÍN.** Mariscal Cáceres: Quebrada de Cachiyacu, 500–600 m, *Schunke* 8494 (F, MO). San Martín: Vaca Pozo, Río Chumbazo al SE de Tarapoto, 830 m, *Woytkowski* 35178 (F, MO); Alto Río Huallaga, 360–900 m, *Williams* 6891 (F, GH, US). **UCAYALI.** Coronel Portillo: cerca Divisoria, 1400 m, *Ferreira & Jones* 19020 (USM). **TACNA.** Tacna: near Tacna on road to Calientes, 500 m, *Metcalf* 30356 (GH, MO). **TUMBES.** Prov. Unknown: *Ferreira* 10744 (MO, USM). **NO EXACT LOCALITY.** *Matthews s.n.* (US); *Wilkes s.n.* (GH, MO, NY).

Acknowledgments

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